THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, JANUARY 22, 1881. No. 23.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,— may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. I. D. GRAHAM, President.
G. H. FAILYER, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

The Agricultural Press.

The Committee on Agriculture of the National Grange, in its report at the recent session in Washington, speaks in the following language of the importance and value of agricultural papers: "As a potent means of advancing the best interests of agriculture, we desire to call attention to the agricultural press. It is the vehicle of thought provided for our especial use, and adapted more or less to our requirements as we make them appear. With proper support, we may give the papers conducted in our behalf, much higher usefulness, and secure through them just consideration for our industry, more surely and quickly than in any other way. If such papers are true in purpose, earnest in thought, faithful and alert, they place us under obligations that will be but imperfectly discharged by payment of their cost. We commend them as worthy of fuller recognition; and we would enjoin upon all farmers the duty they owe to themselves, to receive the aid thus offered at such small cost.

"All the learned professions are crowded to death. An advertisement for a teacher of any kind will bring from twenty to fifty applicants. A vacancy in a pulpit draws the longing gaze of a score of pulpitless parsons. Every city has three times as many lawyers as it should have; and every village, twice as many physicians as can get a decent living in it. At least twenty per cent of the men in the learned professions are either starving to death or being starved out of their chosen callings. But when you want a chemist to accept a $3,000 position in a factory, you must send to Europe for him. If you need a man capable of managing a mill, you must pay him from $5,000 to $10,000 a year; and, in almost every branch of mechanical business, there is a scarcity of educational masters. We have been making ministers, teachers, and lawyers, to send west or south, or eke out a miserable existence here, when we should have been educating chemists, engineers, designers, and draughtsmen, for our own shops and factories."—*Colman's Rural World.*

A New Jury System.

We would suggest that twelve jurors be appointed by the governor for each circuit, and paid a reasonable salary for a fixed and definite term. This jury would travel about the circuit in the same manner as the circuit judge: they would generally be totally disinterested, and, holding office by appointment, would never decide for political purposes. By experience, such a jury could learn to sift the true from the false testimony in almost every instance: by practice they would become expert in weighing testimony and judging of the credibility of witnesses. Their verdicts would be sooner rendered, and more often in the right; for their judgment would be the result of the deliberations of twelve men whose every-day business and study was such as to make their judgment peculiarly quick and accurate in such matters.—*Kentucky Law Reporter.*

Aid.

Two boxes of goods from the East were received at the depot on Monday, marked "For the sufferers in western Kansas;" and while we suppose we should feel deeply grateful to the kind-hearted people who contributed these goods, for the spirit of philanthropy shown in coming to the rescue of a starving people, we confess that away down in the bottom of our hearts we don't; and we vigorously protest, in the name of the people of this county, against being rated as paupers, either at home or abroad, without our own consent.

Smith county contains a population of 1,400, by the last census; and, although there was an almost total failure of the wheat crop last year, and a shortness in some localities of a corn crop, we venture to assert, without fear of contradiction, that there is not to-day within its limits, a family or person wanting any of the necessaries of life, whose wants would not be relieved in his own neighborhood, by letting his necessities be known. And where local assistance is not sufficient or forthcoming, the county is amply able and willing to care for its needy citizens; and we would add that there are probably as few actual paupers in this county as in any community of equal population in the country.

Wheat is selling here at 80 cents a bushel, and corn at 15 cents, with thousands of bushels surplus. Our merchants are doing a thriving business and making money; and while the loss of crops has made ready cash a little close with many of our people, they are still abundantly supplied with that invigorating article called hope, and we are not suffering nor asking for aid.—*Gaylord Herald.*

The Patent Office.

The U. S. Patent Office has been a wonderful instrument in promoting the progress and prosperity of the country; and it is gratifying to know that, while its fees are so low and the franchises it confers so cheap that the poorest inventor can afford to invest himself with proprietary rights in the product of his genius (a condition necessary to encourage invention), the bureau is nevertheless not only self-sustaining, but earns a surplus of revenue beyond the amount necessary to meet its current expenditures. The receipts for the past year aggregated $730,547.12, and the expenditures $538,926.43, showing a net revenue to the government of $191,620.69. The number of applicants for patents was 21,671, and the number granted was 13,153. Of the latter, 1,313 are withheld for non-payment of final fee. Of the total expenses, about three-fourths were paid for official salaries, a fact which indicates that the office might possibly be conducted a little more economically. During the year, 3,364 patents expired and 496 were reissued. Out of 732 applications for registry of trade marks, 515 were granted. The sum of $49,987 was expended on the Scientific Library.—*Secretary Schurz's Report.*

Curious Facts About Tools.

When we study the construction of our most imporant implements, we discover, to our astonishment, that the latter are true copies of some part of our bodies, and simply a further completion of them.

In the first stone hammer, man has unknowingly imitated his fore arm and closed fist; in the shovel and the spoon, we see the fore arm and hollowed hand; in the saw, we find the reproduction of a row of teeth; tongs represent the closing together of the thumb and fingers; in the hook, is reproduced the bent finger; the pencil is simply a prolongation of the fore finger. So we see, in all instruments, from the simplest to the most complex, only an improvement and completion of the human organs; and thus we find that all inventional thoughts of men are directed towards the same aim as that towards which organic development tends.—*Scientific American.*

Kansas Ahead.

The December, 1880, report of the condition of the crops throughout the United States, has been received from the Department of Agriculture, at Washington. As regards winter wheat, it shows that the increase in the country in acreage over last year, is four per cent: the large increase is in Kansas, which is thirteen per cent; Ohio three per cent; and Misouri two per cent. The yield in corn for the country is about the same as for 1879, the prduct being 1,537,535,900 bushels.

The report of crops received from the various counties in this State are encouraging, and invariably show increase and fine prospects for larger yield next year. In fact, Kansas' prospects for 1881 are better than those of any other State in the Union; and the *Times* misses its guess very far if Kansas does not lead all the States this year, when the returns come in.—*Leavenworth Times.*

Our Exchanges.

From a number of farmers, we learn that the continuous dry weather and absence of snow have ruined late-sown wheat.—*Wyandotte Gazette.*

It is now very generally conceded that there is not a city or township bond in the county at present that will be paid, unless it be at the tail-end of a long lawsuit.—*Sumner County Press.*

Andy Wilson's Mexican sheep are dying at the rate of forty a day. They have the disease known among sheep breeders as "scab and spots;" and they certainly must have it bad.—*North Topeka Times.*

At the meeting of the State Board of Agriculture, held at Topeka, Thursday, R. W. Jenkins was elected president; John Kelly, vice-president; J. K. Hudson, secretary; and Messrs. J. T. True, Joshua Wheeler, W. P. Popenoe, J. Y. Johnson, and M. Mohler, were chosen directors.

Mr. Adam Beckle, on going to his feed-lot last Saturday, found two of his horses fast in a wire fence. On approaching them, the one, a two-year-old colt, made a plunge and broke two of the wires, thus freeing both, the other being a five-year-old horse. Both animals were badly cut up. Mr. Beckle had another horse used up by the same means, a few days previous.—*Onaga Journal.*

The attendance at the State Normaly esterday morning, upon the resumption of the winter term after the holiday vacation, included about one hundred students, which is considerably short of the number that would have been present had it not become necessary to postpone the opening of the session by reason of repairs which were being made on the heating apparatus.—*Emporia News.*

Mr. Lemmon, recently State Superintendent of Public Instruction, was one of the most efficient officers who ever served the State. He has thorough and practical knowledge of every department of school work; and under his management the school system of Kansas has gained a high and very enviable reputation. It is with regret that we note his retirement. We look for good work from him in the Legislature.—*Brookville Transcript.*

There ought to be a thorough course of instruction, in our schools, in the art of shutting doors. The first lesson would inculcate the elemental and simple duty itself. Boys and girls should be kept passing a doorway, each one opening and closing the door for themselves, until not a mother's son or daughter of them could leave a door ajar. Then the finer features of the accomplishment might be introduced. There are people who always slam a door; there are others who hold it open, and close it so slowly that a whole procession of diseases, including colds in the head, catarrh, sore throat, diphtheria, inflammation of the lungs, and the epizootic, can march through.—*Elk Falls Signal.*

THE INDUSTRIALIST.

SATURDAY, JANUARY 22, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Co-operation a Creation.

Thomas Hughes, in one of his addresses, quotes a remark of a friend of his, as follows: "In my case, our system of co-operation is literally a creation. It makes something out of nothing, without work or effort or sacrifice on the part of members." This is an extravagant statement, and yet it is shown to be true. In 1860, this gentleman paid a single pound for a share in a co-operative store in Manchester. He purchased his family supplies at the same store, withdrawing no dividends, which were quarterly paid to stockholders. In 1873, he wanted money; and, to his surprise, found fifty-three pounds stood to his credit on the books of the association. Thus, his one pound had gained more than five times ten pounds, with "no work or effort or sacrifice on his part." He had purchased his goods at the co-operative store as cheap as he could have procured them elsewhere; and he had spent no time in looking after his investment. Hence, he could say, "Co-operation is literally a creation."

The experience of stockholders in the Blue and Kansas Valley Co-operative Association, is quite as striking. In 1877, a farmer's wife paid five dollars for one share. Since that time, she has purchased her groceries at the grange store, allowed her dividends to accumulate, and she now owns stock to the amount of thirty-five dollars. Another woman owns four shares of five dollars each, which cost her absolutely nothing. The stock in both cases is drawing an annual interest of ten per cent, payable quarterly. The money can be withdrawn at any time, on giving the required notice.

The question at once arises, How can something as tangible as dollars come out of nothing? How can stock paying ten per cent be secured and held by one whose earnings must wholly go to procure the necessaries of life? Let us try to explain. The distinctive principle of co-operation is this, —an equitable division of profits among those who produce the profits. The woman who could not raise five dollars to purchase a share in the grange store, bought her groceries there. In less than a year, her share of the profits amounted to the price of a share. As soon as she became a stockholder, she received ten per cent interest on her stock, and her share of the profits was doubled. She has paid no higher price for her groceries than her neighbor who has patronized other establishments; she has paid nothing for her stock; and yet she has $20 to her credit.

In every thriving business, profits arise as naturally as crops grow out of the earth. As the harvest shows an increase, sometimes "thirty, sixty, or even an hundred-fold," so is it with profits, in many kinds of business.

A portion of the capital of every civilized community must be employed in effecting the exchanges of commodities used by the people. This capital generally increases more rapidly than that employed in other ways, because it is oftener "turned over." A thousand dollars invested in a crop of wheat, cannot be "turned" in much less than a year; while an equal sum invested in staple groceries may be turned over a half-dozen times in the course of the year, each time increasing in size. Usually, these greater profits redound to the advantage of the few: by co-operation, they are distributed among all who have contributed to produce them. In one case, the capital and the management of the business are combined in one person: in the other, those furnishing the capital employ an agent to conduct the business. Under the management of a competent agent, the quarterly dividends regularly come to the shareholders, without "work or effort or sacrifice on their part;" and hence co-operation is for them a creation.—*Prof. Ward.*

Institution for the Deaf and Dumb.

While at Olathe recently, we visited the State Institution for the Deaf and Dumb, located in that place. We found the school in a flourishing condition. Great improvements have been made since our visit there a few years ago. The new principal, Prof. DeMotte, is making a good impression. Two of the teachers are deaf mutes, graduates of a similar institution in one of the eastern States. The widow of the late principal, Maj. Bowles, who re-organized the Institution on its present basis, still remains as Matron. About 130 pupils are in attendance. The course of study is six years. None are admitted under ten years of age, nor over twenty-one. All expenses, except for clothing and traveling, are met by the State. The annual cost per pupil is about $175.

We were much interested in looking through the industrial departments. A good beginning has been made in the line of industrial education for this class of unfortunates. Besides what may be learned in a general way in raising vegetables and fruit for the inmates of the Institution, three trades are presented to the choice of the boys,—cabinet-making, shoe-making, and printing. Only one of these, shoe-making, can be wholly learned there. The cabinet shop is only partially furnished. In the present equipment of the printing-office, only type-setting can be learned, which is but a small part of the printer's trade. After he leaves his teachers, who communicate with him by sign language, who will teach the deaf mute the part of the trade he cannot learn in the State institution? The State should fully furnish these shops. The girls are taught sewing, and are required to do the light work about the building. There is as yet no regular course in household economy, as we have in the Agricultural College.

In our opinion, the course of education and training in charitable institutions of this kind, should prepare those who receive it, to be able to care for themselves when thrown upon their own resources.—*Prof. Ward.*

Educational Journals.

The new bi-monthly *Education* is meeting the anticipations of educators. We have read the third number with great interest.

The *Journal of Education* comes to our table weekly, filled with good things. The last number contains an article on "The English Language in Primary Schools," which we wish every common-school teacher in this State, would read. Were the INDUSTRIALIST a large sheet, we would give the valuable suggestions contained in this paper, to our readers.

A specimen copy of the *Educational Weekly*, published by J. Fred Waggoner, Chicago, is just received. The subscription price is $2.00 a year; but it will be sent on trial to any teacher three months for twenty-five cents. It is a newsy sheet. If patronized as it ought to be, it will become for the western States what the *Journal* is for the States east of the Alleghanies,— a vehicle of educational news. All of the above-named periodicals are found in the College reading-room.—*Prof. Ward.*

FINANCIAL CONDITION OF THE KANSAS STATE AGRICULTURAL COLLEGE, DECEMBER 31st, 1880.

TREASURER'S REPORT.--Audited Jan. 7th, 1881.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—Herewith I present, for your inspection, my report for the period commencing July 1st, 1880, and ending December 31st, 1880, inclusive.

INTEREST ACCOUNT.

Balance due Treasurer, as per report June 30th, 1880	$ 5,598 14	
Paid out on approved vouchers	8,998 57	=$14,596 71
Received from all sources since June 30th, 1880		11,971 45
Balance due Treasurer		$2,625 26

LAND-SALE ACCOUNT.

Balance in hands of Treasurer, as per report June 30th, 1880	$29,569 49	
Received from all sources since June 30th, 1880	18,582 28	=$48,151 77
Paid on warrants of Loan Commissioner		40,758 75
Balance in hands of Treasurer		$7,393 02

REFUNDING-TAX APPROPRIATION.

Balance on hand, same as per report June 30th, 1880	$1,569 57

SECURITIES IN HANDS OF TREASURER.

Refunding-tax Appropriation, act of Legislature, 1877		$5,000 00
Redemption Tax Certificates on College lands, paid by order of Board of Regents		$1,695 97
Real-estate securities and real estate taken under foreclosure,—		
Notes for real estate resold	$ 5,715 00	
Contracts for real estate resold	11,200 00	
Real estate yet on hands representing a value on my books of...	1,712 78	=$18,627 78
College Bonds Investment, act of Legislature, 1877		11,000 00
Noble township, Marshall county, ten per cent bridge bonds		800 00
School bonds bearing interest at ten per cent	$102,715 84	
School bonds bearing interest at seven per cent	80,543 75	
School bonds bearing interest at six per cent	300 00	=$183,559 59
		$220,683 34

Of the above-named school bonds in my possession, there are now past due,—

Ten per cent bonds	$9,981 98	
Seven per cent bonds	212 00	=$10,193 98

Most of these bonds will, in my opinion, be paid before the close of the present fiscal year; and, as they draw interest at the rate of ten per cent and seven per cent respectively, the College will be no loser by the delinquency.

There are also in my hands, past due, coupons of,—

Ten per cent school bonds	$5,459 93	
Seven per cent school bonds	1,168 41	=$6,628 34

These coupons draw interest after due, at rate of ten per cent and seven per cent annually; and will, in my opinion, very nearly all be paid during the present fiscal year, and as paid will be passed to the credit of your interest account.

All of which is respectfully submitted. E. B. PURCELL, Treasurer.

LAND AGENT'S STATEMENT, in Summary.--Quarter ending Dec. 31st, 1880.

LANDS:—		
Acres unsold Sept. 30th	24,417.94	
Acres received by cancellation of contracts	2,068.11	=26,486.05
Acres sold since Sept. 30th		2,871.19
Acres unsold Dec. 31st		23,614.96
Acres under contract Sept. 30th	16,751.78	
Acres sold under contract since Sept. 30th	2,871.19	=19,622.97
Acres returned by cancellation of contracts	2,068.11	
Acres patented since Sept. 30th	800.00	= 2,868.11
Acres under contract Dec. 31st		16,754.86
SECURITIES:—		
On hand Sept. 30th	$73,383 53	
Added by sales since Sept. 30th	16,685 08	=$90,068 61
Cancelled by forfeiture	14,089 23	
Paid in full	3,165 34	= 17,254 57
On hand Dec. 31st		$72,814 04
CASH:—		
From sales	$2,415 87	
From installments	3,165 34	=$5,581 21
From interest	1,950 41	
From interest on interest	62 70	= 2,013 11
Total		$7,594 32
Paid Treasurer, October and November		$5,086 89
Paid with report for December		2,507 43
Total		$7,594 32

Interest due, uncollected, $3,279.00.

L. R. ELLIOTT, Land Agent.

SUMMARY FROM SECRETARY'S ACCOUNTS.--Approved Jan. 7th, 1881.

ENDOWMENT FUND.—Dec. 31st, 1880.

PRODUCTIVE FUNDS.

WITH TREASURER:—		
School bonds, interest ten per cent	$102,715 84	
School bonds, interest seven per cent	80,543 75	
School bonds, interest six per cent	300 00	
Township bonds, interest ten per cent	800 00	
Real-estate securities, interest eight to ten per cent	16,915 00	=$201,274 59
WITH LAND AGENT:—		
Securities on part-paid lands		$ 72,814 04
Total fund drawing interest		$274,088 63

UNPRODUCTIVE FUNDS.

WITH TREASURER:—		
Cash awaiting investment	$7,393 02	
Real estate, held under foreclosure, cost	1,712 78	=$9,105 80
Claims against the State,—		
College bonds, invested under act of 1877	$11,000 00	
Refunding-tax appropriation	5,000 00	
Tax-redemption certificates	1,695 57	=$17,695 57
WITH LAND AGENT:—		
Cash, with report of December collections		$2,302 87
Total fund not at interest Dec. 31st		$29,104 24

Entire product of sale of endowment lands, $303,192.87.
Acres of land yet unsold, 23,614.80.

INCOME FUND.—December 31st, 1880.

RESOURCES:—		
Cash, December report of Land Agent	$ 204 56	
Credits to Departments, allowed	234 31	=$ 438 87
Accounts,—		
Interest on bonds, past due	$6,628 34	
*Interest on part-paid lands, past due	3,279 00	
Rent, to be collected	25 00	=$9,932 34
Total resources		$10,371 21
LIABILITIES:—		
Balance due Treasurer, Dec. 31st, 1880		$2,625 26
Bills filed for approval and payment		3,396 81
Total liabilities		$6,022 07

Excess of resources over liabilities, $4,349.14.

*Liable to forfeiture with cancellation of contracts.

GEO. T. FAIRCHILD, Secretary.

THE INDUSTRIALIST.

SATURDAY, JANUARY 22, 1881.

We are under obligations to Professor W. A. Henry, of the University of Wisconsin, for the annual report of the Board of Regents of that institution.

Handsome catalogues and almanacs have been received from Trumbull, Reynolds, & Allen, Kansas City; *The Homestead*, Leavenworth; the Plant Seed Company, St. Louis, Mo.; and Jas. J. H. Gregory, Marblehead, Mass.

On Monday ten porkers—pure Berkshires—were sold from the College farm, which in form and quality are not easily beaten. The ten averaged 397 lbs. per head, and the price received was $4.20 per cwt. Said a butcher in our hearing, "They are worth 20 cents a hundred more than common stock."

A young man connected with this office recently undertook to jump nimbly out of a buggy, going over the hind wheel, while balancing aloft in his hand a galley full of type. He succeeded. Since then, twenty-five young people have been industriously picking out type, rules, quads and "sich," from several shovelfuls of miscellaneous matter, mostly mud and snow.

Several new papers and periodicals have recently been placed on the files in the College Library. The *Scientific American*, and Supplement, *Scribner's Monthly*, furnished by the College authorities; the semi-weekly *Tribune*, by J. T. Willard, the assistant librarian; *Christian Cynosure*, by Father Limbocker. *Harper's Weekly*, the *Advance*, the *Standard*, the *Nation*, and other papers, are regularly contributed by different members of the Faculty. These, with the exchanges of the INDUSTRIALIST, numbering over one hundred, furnish our College reading-room with an equipment seldom surpassed.

BREEDERS' INSTITUTE.

A Breeders' Institute will be held, under the auspices of the Central Kansas Breeders' Association, in this city, Feb. 15th and 16th, for the purpose of discussing questions connected with the improvement and management of live stock. A number of gentlemen, prominent in live-stock matters, have promised to be present and to furnish papers and addresses. Programmes will be issued by Feb. 1st. The work of the Institute will be divided into four sessions, beginning promptly at 2 P. M. The forenoon of Feb. 16th will be devoted to visiting the Agricultural College and herds of the vicinity, for which conveyances will be provided.

You are requested to be present and take part in the discussion. O. W. BILL, President.

E. M. SHELTON, Secretary.

SOCIETY HALL, January 21st, 1881.

House called to order by President Jeffery. Miss Harvey was initiated. The subject of debate, works of fiction, was thoroughly discussed. The question was decided in favor of the negative. Several interesting questions were spoken on in extemporaneous speaking, after which we had a recess of five minutes. The music committee supplied good music. Declamation, essay, and select reading, were good. Under miscellaneous business, the Society resolved to have a moot-court in three weeks. The debaters for next Friday are Mr. McConnell and Mr. Barrett on the negative, and Mr. Clothier and F. M. Jeffery on the affirmative. The question is, "*Resolved*, That, in a moral light, the South should never have been admitted again to the Union." *Gleaner* will be presented next Friday by Mr. Howard and Miss Haines.

PHOSPED.

COLLEGE SHORT-HORNS.

A newspaper writer says of Short-horn cattle on our Agricultural College grounds, that "they are uniformly red, and for size, touch and symmetry are hard to surpass." We always supposed that "for touch" the mule surpassed anything we ever saw. We have had experience, but of course give way, in our set opinion, to the solid judgment of agricultural professors. The mule must take a back seat.—*Kirwin Chief.*

"Out of the fullness of the heart, the mouth speaketh." We are convinced that the editor of the *Chief* has had "experience;" and we trust that he will not allow himself to "give way" to any "agricultural professor." What we wish to know is, (1) how Bro. McBride touched his Short-horns, and (2), and more particularly, how they touched him. We expect an "affecting recital,"—one that will make us hold our sides with laughter, or pour forth the "sympathetic tear" at the woes that overtook the confiding editor in northwestern Kansas, who became too intimate with the "business end" of a mule.

SOCIETY HALL, Jan. 15th, 1881.

The Webster Society was called to order by President Thompson. After roll-call and devotion by Mr. Hutto, the officers for the easuing term were inaugurated. Mr. Thompson, the outgoing President, then favored the Society with a short valedictory; and his successor, Mr. Myers, with an inaugural address. The names of James Rogers, J. C. McElroy, and E. C. Anderson were balloted on for membership; and these gentlemen, together with C. E. Houston, were initiated. Question debated, "*Resolved*, That the number of the standing army should be increased to 50,000," decided in favor of the affirmative. The order of extemporaneous speaking was well conducted. After the usual recess, the *Reporter* was presented by D. S. Leach, and showed considerable care in preparation. Question for next meeting, "*Resolved*, That the resources of Kansas fit her for becoming the greatest agricultural State in the Union." Affirmative, C. E. Houston and Geo. F. Thompson; negative, J. H. Calvin and J. A. Sloan. Next followed report of critic and reading of minutes. The Society adjourned.

CALL.

The monthly lectures in chapel, by members of the Faculty, are proving to be one of the most interesting and valuable exercises of the College. Four of these lectures have been presented. The first, by President Fairchild, on "The Advantages of a Course of Study," the second, by Prof. Ward, on "The Tenure of Land," have already been noticed. The third in the series, delivered by Prof. Shelton, in December, was not noticed at the time, because of the careful watch which the Managing Editor usually keeps over the local columns of the INDUSTRIALIST. In his absence today, we embrace the opportunity to say that the subject of Prof. Shelton's lecture was, "Doing, with some suggestions as to how it is done." The lecture was permeated through and through with the personality of the author, and of rare excellence as a literary effort. It will well bear repetition, and would come in place in any course of popular lectures.

The fourth lecture in the course was given yesterday, by Prof. Failyer. It was a very successful attempt to present a scientific subject in a thoroughly popular manner. The subject was, "Explosives." The Professor spoke of explosives in general; and then in detail of gunpowder, nitro-glycerine and its modifications,—dynamite, duallin gun-cotton, and the fulminates,—giving their composition, properties, and applications in the arts. The principal feature of the lecture was to show the explosive properties of the dust which ordinarily accumulates in mills and factories, when mixed with air and ignited. Various instances of the total destruction of flour mills, planing mills, and candy factories, by explosions of dust, were recounted. Experiments were performed showing how these explosions took place.

The dusts experimented upon were wheat flour, powdered starch, dust from the dust-room of the Manhattan Mills, and Lycopodium powder. By means of a hand bellows, the dust was driven in clouds into the air, and ignited by a spirit-lamp over which it passed. In each case, the vast volume of flame, due to the burning dust, showed its explosive power. It was noticed that the explosions were greater in the case of the finer and lighter dusts. Some of the dust was exploded in a box, the top of which was covered with several thicknesses of stout paper. The result fully demonstrated the explosive nature of these dusts when burned in a confined space. This explosive action was explained to be the result of rapid oxidation, due to thorough admixture with air, the solids being changed to gases which are greatly expanded by the heat of combustion.

The Professor gave some valuable suggestions as to precautions which ought to be taken in constructing mills and factories.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procure books before coming can learn what are used by inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us. Its meetings are held on the first Friday evening of each month.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductiye. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles pf plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, JANUARY 29, 1881. No. 24.

KANSAS STATE AGRICULTURAL COLLEGE.

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DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. I. D. GRAHAM, President.
G. H. FAILYER, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

President's Report.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—In presenting a report which ought to include the eighteen months since the last executive report, I am embarrassed somewhat by the fact that but seven months of this period have been under my supervision. Having been, very unexpectedly to myself, elected by you in September last, I entered upon duty here December 1st, 1879, immediately after completing my fifteenth year in the Michigan State Agricultural College, from which you called me.

In taking hold of the work in this College, I have very naturally assumed that you expected my experience of the past to guide somewhat in solving the various questions arising here; and I gratefully acknowledge my obligation for the cordial confidence shown by you in all our intercourse.

Most of my efforts during the months past, have been toward a minute acquaintance with all the departments of the institution. In this I have met the good will of all the officers, and find myself better satisfied than I expected when first undertaking these duties.

In the general policy of the College, I find no need of material change, believing that the success of all such institutions lies in their adaptation to the immediate and expressed wants of the people. I find the College fairly started in the way of meeting the call for direct union of mental training and manual skill. Any changes I may have suggested or may yet have to suggest, are in the line of more complete work in both respects. After these months of acquaintance, I am, even more than at first, impressed with the wisdom of your action looking to greater thoroughness of discipline in both class work and industrials. I hope another year may make more evident the development of industrial energy for agriculture in all forms, which must ever be the leading interest for the College, as for the State.

My personal cares, outside executive duties, have so far included the teaching of a single class, and the oversight of commencement preparations. The fourth-year class of eight members completed satisfactorily Jevons' Elements of Logic, and passed examination June 7th. Two students were obliged to leave during the winter term, on account of ill health. Seven graduates—two gentlemen and five ladies—prepared their final orations under my direction, having reported to me for rhetorical drill during several months.

Executive duties have been very confining, on account of numerous details as yet unfamiliar. I have sought to make no changes in the usual routine, before completely understanding existing methods; and full weight has been given to precedent in judgment of action and methods. Regular weekly Faculty meetings have been maintained, and all matters of general discipline or interest have been considered with marked interest and unanimity.

The students have been orderly, and generally well disposed. In a few cases parents have, by advice, withdrawn students who were failing in study or deportment. Several have been reprimanded, and one suspended, for willfully absenting themselves from classes. Six in one company have been expelled for the crime of stealing or abetting the act. All but one of this company were from the same neighborhood, and all were intimately associated here. Their names are marked in the catalogue just ready for issue.

The numbers in attendance have been greater during the past year, I believe, than ever before, while at the same time the average age is greater also. In 1878-9 the whole number of students was 207—151 male and 56 female. In 1879-80 the whole number was 276—203 male and 73 female. The average age, without fractions of years in individual ages, has been for a series of years as follows:—

1875-6	17.70
1876-7	18.12
1877-8	18.16
1878-9	18.61
1879-80	18.86

This increase of more than a year in the average age during the last five years, is partially explained by the wider range of territory from which students are drawn. The following table of counties and States represented, shows the gradual increase:—

Counties.	*1878-9...*	*1879-80.*	*Counties.*	*1878-9...*	*1879-80.*
Allen	1	1	Neosho	2	.....
Anderson	...	4	Norton	.....	1
Atchison	4	1	Osage	2	1
Barton	...	2	Osborne	1	1
Brow	...	1	Ottawa	3	5
Butler	6	7	Phillips	.....	1
Chase	...	3	Pottawatomie	6	8
Cuautauqua	4	1	Republic	1	.....
Cherokee	18	13	Riley	65	77
Clay	3	9	Rush	.....	1
Crawford	2	1	Saline	2	4
Coffey	3	...	Sedgwick	1	2
Cowley	3	5	Shawnee	8	27
Davis	6	9	Smith	1	.....
Dickinson	3	4	Sumner	2	1
Douglas	...	1	Trego	.....	1
Ellsworth	1	...	Washington	.....	1
Elk	...	1	Wabaunsee	6	10
Ford	1	...	Wilson	3	2
Franklin	...	2			
Greenwood	1	7	STATES.		
Harvey	1	...	Illinois	3	2
Jackson	2	3	Iowa	1	1
Jefferson	4	6	Massachusetts	.....	2
Jewell	1	2	Michigan	.....	1
Johnson	8	11	Missouri	1	5
Labette	1	...	New Mexico	.....	1
Lincoln	2	...	New York	2	1
Linn	...	1	Ohio	.....	2
Lyon	7	4	Pennsylvania	1	.....
Marion	...	1	Vermont	1	.....
Marshall	2	4			
McPherson	...	1	TOTALS.		
Miami	...	1	Number counties.	40	48
Mitchell	2	2	Number States	6	8
Montgomery	3	2	Number students	207	276
Morris	...	3			
Nemaha	6	5			

During the last three years, a record of which is presented in the new catalogue, 458 different students have been in attendance, representing 61 counties of Kansas by 432 students and eleven other States by 26 students. These are classified as follows: Fourth year, 28; third year, 45; second year, 138; first year, 245; in select studies, 2. Of these, 20 have taken the degree of B. S., making the whole list of graduates 56: gentlemen, 33; ladies, 23. A full list of the graduates, and also of the officers of the College from the beginning, in 1863, has been appended to the catalogue as a matter of interest and convenient reference. The catalogue is printed in the Printing Department, and does credit to Superintendent A. A. Stewart.

Much of my time has been taken up in study of such a system of record in the Secretary's office as may present concisely the financial condition of the College in all departments. A summary of results I present you in financial statements and forms. In this work I have enjoyed the assistance of Superintendent I. D. Graham. He has also aided me in filing and arranging vouchers, reports, letters, etc., accumulated in past years, so that all are within easy reach. The students' records of standing for the past two years have been completed, and all students in attendance since January last have their names entered in the new and permanent record, with a full posting of their past standing.

The general condition of the grounds and buildings has improved materially during the past two years. The completion of the north wing of the new building, provided by appropriation in 1877, adds to both appearance and comfort. The closing of the lane through the center of the farm, and removal of fences, sheds, etc., with adjustment of walks and drives about the buildings, have also improved the whole, setting more prominent the growth of trees and lawns. Improvements in the building now used as chapel, etc., are found satisfactory.

Of the several departments no general report is needed, since each is represented by a separate report. I believe all to be doing excellent work.

The prospect of increased numbers and more stable attendance seems such as to awaken inquiry for sufficent room in chapel, class-room and library. With present rate of increase, need of a chapel will be very evident before another two years are passed; and the library will soon be wanted, if we gather only such books as an agricultural college must have, to keep pace with the times. The Woman's Department needs better accommodations, with increasing numbers and increasing duties of the Superintendent.

Provision for increasing expenses is also suggested by this enlargement. The endowment will need to be made as productive as possible, that our income may meet expenditures; since not only will general expenses increase, but the demand for fuller and more exact experiments will soon be felt. It is also to be hoped that the improvement of the farm and grounds may continue to keep pace with the general advancement of the State.

These suggestions grow so directly out of the facts of this report, that I may be pardoned for introducing them. They, with the report, are respectfully submitted for your consideration.

GEO. T. FAIRCHILD, *President.*

Our Exchanges.

The Perry *Chief* says that a teacher of the public school at that place, was fined $15 and costs for excessively punishing a pupil, last week.

Reports say that a great many cattle have died on the range during the past two weeks. The storms have been the most severe experienced for many years.—*Mankato Review.*

A Rooks county preacher has abandoned a protracted meeting, because, he says, it is impossible to carry it on on corn bread and sorghum for himself, and one ear of corn per day for his horse.—*Dodge City Times.*

On Tuesday of last week, a boy was arrested at Delphos for ill using his mother. The case was heard before a justice of the peace, who convicted and sentenced him to three years in the State Reform School.—*Junction City Tribune.*

One of the most provoking episodes is for a man to meet a lady, and, in endeavoring to raise his soft hat by the crown, find he has on his Derby, and claw all over the top of it before recalling the change in head-gear. In the meantime, the young lady glides by, wondering what the mischief is the matter, and if he is losing what little mind he once possessed.—*Capital.*

A good story is told of a Dodge City divorce suit. The jury refused to grant the lady a divorce. When the court inquired if she wanted to "poll the jury," she said "that's just what I would delight to do, if your honor would give me a pole;" and the glance she gave the jury made the cold chills run up and down their spinal columns. —*Great Bend Tribune.*

THE INDUSTRIALIST.

SATURDAY, JANUARY 29, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Tell the Truth About it.

We are just entering upon that season of the year when grain dealers, speculators, and gamblers, in all the great commercial centers, are anxiously casting about for information concerning the condition and prospects of this year's wheat crop. Circulars propounding questions under this head will soon be scattered broadcast among the farm homes of the land; and the agricultural papers are already importuning their readers for "crop reports." Now, it may not be known to farmers that the answer given to these innocent-looking questions will do much towards determining the course of speculation, and consequently prices, during the coming year. If these reports show that the crop has wintered without injury, and that the acreage is as large or larger than that of last year, then prices will inevitably tend downwards; but, if on the other hand, this very severe and protracted winter has injured the growing crop sufficiently to affect the yield in any considerable degree, then the course of prices will tend upwards.

All we have to say to farmer friends in this connection, is, "Tell the truth about it." Don't let any false pride, or fear of injuring your neighborhood or driving away immigration, prevent you from saying so, if the wheat has suffered; and we urge this on the prosaic ground that you can't afford to do otherwise. If the crop is to be a light one, we want all that can be got out of it; but this cannot be done, if we convince the speculators that the crop is to be a large one. It is worth while to remember, too, that a short crop, or one that is injured in any way, is almost certain to give a less yield than was anticipated, because the waste in harvesting and handling is much greater in proportion than with a full crop.—*Prof. Shelton.*

The Tame Grasses, once More.

The writer has written a good deal upon the subject named at the head of this article within the last few years, and only allows himself to be "drawn out" again in answer to a score or more of inquiries lately received on this subject.

The very best of all the "tame grasses" that we have yet tested upon the College farm is the old-fashioned "cock's foot," more commonly, perhaps, known as orchard-grass. For its successful growth, it requires a deep, rich soil; and not less than one and one-half bushels of seed should be sown to each acre. We have found it a positive advantage to mix with the orchard-grass seed, clover seed at the rate of one or two quarts to each acre. We are confident that generally satisfactory results with seeding orchard-grass will only be obtained when the seed is sown in the spring, upon land that has been plowed, harrowed, and as well prepared as for a grain crop. Our recent experience convinces us that we have generally sown our grass seed too early in the spring. There is really nothing gained from sowing very early, as the seed will not grow until the spring rains have set in, and the risk from high winds is very great.

Perennial rye-grass, commonly called English blue-grass, is another excellent sort, and well worth the attention of Kansas farmers. Upon our rich bottom lands, this will be found to be a wonderfully enduring and productive grass. Prepare the ground as for orchard-grass seed, and sow not less than two bushels of seed per acre; and again we say, mix with this a little clover seed.

Alfalfa, during the first two or three years of its cultivation upon the College farm, gave admirable results; but, during the past two years, it has suffered seriously during each winter season, chiefly, we think, from the depredations of moles. We shall hereafter sow a good deal of orchard-grass seed with the alfalfa, as the moles cannot work in the tough, fibrous roots of orchard-grass. Sow not less than twenty pounds of alfalfa seed to each acre of ground.—*Prof. Shelton.*

Tree-planting on the College Grounds.

As a contribution to the general fund of arboricultural knowledge in this State, a summary is here given of the various experiments made by the Horticultural Department with many kinds of trees, on the grounds of this Institution.

The first attempts at tree culture that have given results of value, were made at the old College, in the year 1872. During this year, plantations of European larch, deciduous cypress, white, red, and green ashes, Osage orange, catalpa, ailantus, black walnut, white hickory, soft maple, and willow, were made. The ground selected for the forest plat was below the average of upland soils, part of it quite dry and gravelly, and all with a southern exposure. The planting of all varieties was in rows four feet apart, laid north and south, the trees standing about one foot apart in the rows. The greater part of the trees grew well, the exceptions being the red ash, white hickory and European larch. The latter have failed entirely since. In 1873, the number of varieties under trial was increased by plantations of box elder, chestnut, white elm, Scotch pine, red cedar, Austrian pine, and Norway spruce.

The results of these plantings so far as developed during the year, show greatly in favor of the box elder, white elm, red cedar, and Austrian pine, as well as those that grew in the planting of 1872. Small plantings of different birches, beech, sugar maple, and chestnut, have resulted unfavorably, in the main; although encouragement is given to continue, on a small scale, the two trees last named.

The year 1874, memorable on account of the invasion of the Rocky Mountain locust, was one of disaster to tree-planters. In the groves on the College grounds, the evergreens suffered more than other trees. The red cedar, mountain pine, Austrian pine, and pitch pine, proved able to withstand the attacks of these insects, while the spruces, Scotch pine, arbor vitæ and junipers, were destroyed almost without exception. The deciduous trees were injured in a comparatively slight degree, with the exception of the European larch and chestnut; the former being entirely killed, and the latter very seriously injured.

The evidence of this year speaks in favorable terms of the ailantus, when planted on high, dry land. In such situations, its tendency toward a succulent late growth is checked, and it is enabled thus to withstand ordinary winters; while on low lands, this tree is only partially hardy. On account of its very luxuriant growth, it affords complete protection to the ground after the first year.

A survey of the various tracts planted in forest trees of various kinds, gives very satisfactory evidence of the ability of some varieties to withstand the ordinary vicissitudes of our climate. Considering the poverty of the soil in which they stand, the black walnuts, catalpa, Osage orange, and cottonwood have made exceptionally fine growth. The wisdom of close planting is here apparent. Trees in these plats, standing about one foot by four apart, have served as a protection to each other,—shading the trunks, rendering them less liable to the attacks of boring insects, and retaining the moisture of the soil. The tendency to a low, spreading growth, which is found on less dense plantations, is here corrected; and the trees take instead an upright form, with smooth, straight trunks branching high. This is, of course, a consideration of great importance where trees are grown for timber.

While the general results are essentially as stated, the fact that trees of some of the less hardy varieties are alive and in a state of vigorous growth, hints at the possibility of greater success with these trees, if they can be fairly started. A few chestnuts are found that have attained a height of fifteen or twenty feet, with corresponding size of trunk. A few white pines, and an occasional spruce, have also grown to good size. The same may be said of the sugar maple and the butternut.—*Prof. Popenoe.*

Going into Hogs.

The very high prices of pork and all hog products now prevailing is, as might be expected, giving an enormous impetus to hog-raising all over the land. Breeders of fine stock positively complain of the orders which crowd upon them with every mail, and their own inability to approximately supply the wants of customers. There can be no doubt that hundreds of persons with moderate capital will this winter make the business of hog-raising more or less a specialty, who have had little or no previous experience, and without any bias of tastes or talents in the direction of the business. "Hog ranches" will start up all over the west; and, on those farms where all the different classes of stock are kept, piggy will get the extra ear of corn and the warm corner, to the detriment of cattle and sheep. In short, people are "going into hogs" as a speculation, just as another class "go into" Wabash or Western Union shares, or invest in options at Chicago.

We have no hesitation in predicting that the great majority of those who invest largely in hogs at the present high prices, will within a year be great sufferers by the venture. In the first place, no such wide fluctuations in price, within a short space of time, are known among any class of farm animals as with swine. So enormously prolific are they that, within a few months, it is possible to change an active and aggressive market into one in which hogs and pork in all its forms are a "drug." That the tone of the present active market in pork will materially change for the worse within a few months, we have not the slightest doubt; and the thing that more than anything else contributes to make this a certainty, is the wide presence of the gentleman who is "going into hogs."

When kept in numbers proportionate to the size and condition of the farm, the hog is one of the most useful and profitable of animals; and then, even if the price of pork is low, he still pays, and pays well, for he subsists, and fattens in many cases, upon what would but for him be an entire waste. But if the price goes up, the legitimate hog-raiser is certain to be the only one who has any for sale; the speculator being only attracted by high-priced commodities.

There are other considerations that the person who is thinking of investing large capital for the first time in pork-making, will do well to ponder. If the farm becomes overstocked with cattle, these can easily be driven to the nearest "range:" in any event, the feed, being rough herbage, is the cheapest. On the contrary, the surplus of hogs can be kept only on grains and other concentrated and very expensive food. Again, the price of cattle products varies but slowly through the year, while hog products fluctuate rapidly, the market not unfrequently breaking down completely on account of weather unfavorable for packing.

Of course, the present rush into hog-raising is of a piece with the craze for Merino sheep which took possession of Michigan farmers in 1864–5, and with the mania for hop-raising which overran Wisconsin about the same time; and we should be blind to the facts of history and experience, if we should doubt that the disastrous end which overtook these enterprises, will ultimately reach this speculation in hogs.—*Prof. Shelton.*

Educational Gossip.

Washington, Washington county, is talking Pinafore.

The boys at the Normal School wear a uniform of blue flannel shirt with white muslin tie. It is not a compulsory matter, however, we believe.

There is a musical jubilee at Lawrence next August, with a chorus of 2,000 voices, Thomas and his orchestra, and several bands, including Gilmore's celebrated band, Carey and Reginier.

The architect of the Central Branch Railway is Miss May Hathaway, of Atchison. She also sets type in the Atchison *Patriot* printing-office. So, don't be discouraged, girls: there are plenty of fields open for you.

The *Educationist* improves with each succeeding issue. In the last number, the articles on "Needed Changes in the School Laws," Sup't Story; "The Graduating System for Rural Schools," Sup't Wharton; and "Kansas Day," Principal Copley,—are full of practical suggestions. Every one of the 6,000 teachers in this State should read the *Educationist.*

Senator Hackney has introduced a bill for the location and building of an insane asylum in Winfield for feeble-minded children, as recommended by Governor St. John. The bill locates the asylum at Winfield, to be built of Cowley county stone, 3 stories high with basement, and with suitable convenience for one hundred and fifty children. The appropriation asked is $50,000,—the ground to be given by the city, and to contain not less than twenty acres.

Again we call the attention of our school board to the fact that a school should be provided at once. It is now nine months since we have had any school; and many children are losing the golden hours never to be gained. A city as rich as Kirwin certainly ought to make some arrangements for schooling the children, at least during the winter months. There are several rooms in town which should be rented; and, while the conveniences would not be first-class, it would be far better thus than not at all.—*Kirwin Chief.*

Every Kansan is proud of our public-school system. The valleys and hilltops of Kansas are dotted with 5,242 school-houses, of which 802 were erected during the past two years. There are, in the State, 340,000 persons of school age; 7,780 teachers are employed; and the total value of school property, not including school lands, is $4,633,044. The permanent school fund of the State now aggregates $1,728,057; and Kansas is paying, for the support of her public schools, about $1,704,092 per annum.—*Leavenworth Times.*

The teachers of Cowley county ask the Legislature to make the following changes in the school law: 1. That a State Certificate and not less than three years' work in the public schools, be made pre-requisite qualifications to the county superintendency; 2. That the county superintendent be required to give his entire time to the schools of his county; 3. That the township system of schools be substituted for our present district system; 4. That high-grade certificates be clothed with a degree of permanency attainable upon successful work in the school-room; 5. That the annual school meeting be changed from August to June or an early day in July.

THE INDUSTRIALIST.

SATURDAY, JANUARY 29, 1881.

President Fairchild went to Topeka on Thursday, on College business.

The Mechanical Department has just finished a set of two dozen T-squares for the Drawing Department. A neat piece of workmanship.

The financial exhibit, by President Fairchild, which appeared in last week's issue, is a very clear statement of the exact condition of the College at date. It deserves the careful attention of all friends of the College.

The very high price of grass seeds of all kinds, is very effectually chilling the ardor of many who were going to try the tame grasses for the first time this spring. We notice that orchard-grass seed retails at $1.75 in St. Louis.

The reports of the several departments of the College, beginning this week with the Executive, will appear on the outside of the INDUSTRIALIST from this time on, until all have been published. Read them, and see what has been done at the College during the past two busy years.

A lady member of the printing class furnishes the following recipe for making printer's "pi:" "Two quarts letters (be sure to get a good assortment), a half cup of three-ems, and the same of en quads. This constitutes the bulk of the pi. Then sweeten with four-ems, and flavor well with commas and periods."

Immediately following the Stock-breeders' Institute, Feb. 15th and 16th, the annual Farmers' Institute will hold a two days' session, Feb. 17th and 18th. Many prominent farmers of the State have promised to be present, and more are expected. Several members of the Faculty will take part. Programme next week.

The Horticultural Department has been busily engaged during the week, in hauling those magnificent evergreens from the old College farm, for the adornment of the new grounds and buildings. This is a very delicate operation, and is, at best, doubtful. The plan is to carry with each tree several hundred weight of adhering frozen earth. We shall watch this experiment with interest.

A large number of inquiries referring to corn, corn-stalks, the "tame grasses," cattle, swine, and many other farm topics, are received every week. This is a branch of work that we always take pleasure in; but those friends who request us to write articles in the INDUSTRIALIST on special subjects, will remember that circumstances, which we cannot always explain, may prevent us from complying with their requests.

SOCIETY HALL, Jan. 28th, 1881.

President Jeffery in the chair. The extemporaneous speaking was lively and interesting. The question of woman's rights was spoken on by many. The *Gleaner*, read by Mr. Howard and Miss Haines, was well prepared and well read. The moot-court was postponed one week. A committee of six was appointed to see that the organ was brought to Society Hall, and taken back Monday morning. Mr. Young and Mr. Helmick debate next week on the affirmative; Messrs. Platt and Ward on the negative. Question, "*Resolved*, That ambition has caused more misery than superstition." The name of Mr. Walden was proposed for membership. The *Gleaner* will be presented in two weeks by Mr. Lightfoot and Miss Cranford. PHOSPED.

The annual meeting of the Manhattan Horticultural Society was held in Horticultural Hall last Thursday afternoon. This meeting is the first one since the decease of the former Secretary, Mr. A. Todd, to whose memory suitable tributes were paid by the members present, especially Mr. T. C. Wells and Professors Lee and Platt.

The election of officers resulted in the choice of the following board: President, Mr. T. C. Wells; Vice-Presidents, Profs. Walters and Failyer; Secretary, Prof. Popenoe; Treasurer, Mr. S. D. Moses.

The time of holding the annual meeting was changed from the second Saturday in December, to the second Thursday of that month. The next regular monthly meeting will be held in Horticultural Hall, at the College, on the second Thursday of February, when Mr. John Blachly will lead in the discussion of the relative merits of the different modes of propagating fruit trees.

WEBSTER HALL, Jan. 29th, 1881.

The Society opened with fair attendance, considering the inclement state of the weather. Roll was called, and F. M. Hutto lead in devotion. Next followed order of debate. Mr. Thompson being absent from affirmative, M. H. Markcum was chosen in his stead. The discussion was good, and finally decided that the resources of Kansas do not fit her for becoming the first agricultural State in the Union. This subject, however, while decision was given with respect to merits pro and con of debate, was discussed with lively interest in extemporaneous speaking, when Kansas received due credit for her superior agricultural resources. Mr. Allen reported as committee on programme for next meeting as follows: Question, "*Resolved*, That we should have free trade in the United States." Speakers, M. T. Ward and Charles Marlatt on affirmative; F. M. Hutto and W. C. Palmer on negative. James Rogers for declamation; and J. C. McElroy, select reading. After report of critic and reading of minutes, the Society adjourned. CALL.

ENTERPRISE ITEMS.

The revival meetings at Trinity Church still continue.

The Knights of Honor are talking of a banquet on the 27th of February.

M. J. Glen sold a car-load of choice cattle at $4.60 a short time ago. The Peaks sold about twelve car-loads for $4.50.

E. S. Bramhall has taken the American House, and will play the role of "mine host" to the weary and hungry traveler.

The streets are very icy and slippery nowadays, and many a person sits down rapidly and rises very slowly with his basement feeling as though it was residing in a refrigerator.

A number of gentlemen connected with the Atchison, Topeka & Santa Fe Railroad have formed a company with a capital of $10,000, which is invested in sheep in the Arkansas Valley. Not a head has been lost so far. The experiment will be looked upon with a great deal of interest by prospective sheep men in all parts of the State.

THE PRAIRIE FARMER FOR 1881.

Now in its forty-first year, the *Prairie Farmer* is old in the sense that the world is old,—old in experience and knowledge, and correspondingly vigorous and able.

Its departments are agricultural, horticultural, stock-raising, veterinary, household, poultry and bees, literary, good health, etc. The market reports are made and corrected up to the moment of going to press, and are rated as thoroughly reliable.

Editorially, the *Prairie Farmer* is independent and non-partisan; but it shall have an opinion and a word upon every important issue, whether social, political, or industrial. It will speak out with no uncertain voice upon all great measures that have bearing upon the productive and commercial interests of the country. Its principal aim at present is to so elucidate the relations of the State to the lines of transportation that a permanent adjustment of rates may be made by legislation and contract, and the interests of all parties—producers, carriers, and shippers—conserved. It will calmly and firmly oppose the extortions of monopoly, without urging the destruction of channels of traffic, or the impairment of vested rights.

The oldest agricultural paper in the Union, the *Prairie Farmer*, with the vigor of perennial youth, is presented to the industrial classes as the ablest and clearest exponent of their rights and wishes, and the truest companion at their farms and firesides.

Terms, $2.00 per year in advance. Sample copies will be sent free on application. Outfit free to agents, who are wanted everywhere, and to whom liberal cash commissions will be allowed. Remittances should be made by postal money order, registered letter, bank draft, or by express prepaid. Address PRAIRIE FARMER Co., Chicago, Ill.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us. Its meetings are held on the first Friday evening of each month.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procure books before coming can learn what are used by inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

KANSAS STATE
AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil, climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.— General principles governing the development of domestic animals. The laws of heredity of disease,— of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*— The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,— in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,— variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.— Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.— One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,— is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY— Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.— The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*— The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,— roots, stems, prefixes and suffixes,— associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.— A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.— The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.— The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.— To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,— marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.— The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.— Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.— The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,— attention being paid to spelling and to short and precise expressions in messages,— abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.— Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

J. G. Adams

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, FEBRUARY 5, 1881. No. 25.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. I. D. GRAHAM, President.
G. H. FAILYER, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Report of Farm Department.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—Your attention is invited to the following brief outline of the work of the Farm Department.

This report includes, first, a statement of the instruction given by me during the past year, and, second, a review of operations on the College farm since November 30, 1878, the date of my last report. Experience has shown the desirableness of having the reports of the Farm Superintendent submitted at the same time with those of the other departments of the College, instead of November 30th, as heretofore. On account of this change, this report, so far as it relates to the College farm, covers the eighteen months ending June 30, 1880.

During the year past I have taught classes as follows:—

1. A class in physiology, numbering sixty-four students of the second year, from whom daily recitations were received during the fall term. The text-book employed is that by Dr. J. C. Dalton. The study of physiology is preceded by a three-weeks' course of lectures on anatomy, in which such a knowledge of form and structure is given as will enable the student to study to advantage the functions of the body. The course in physiology we found to be a valuable preparation to the study of stock breeding, which is taken by the same class during the winter term following.

2. A course of lectures on practical agriculture given to five members of the Senior class. This course embraces such complex subjects as Rotation of Crops, Agricultural Experiments, Stock Feeding, Manures, Farm Buildings. Much original work, in the way of planning farm buildings and arranging rotations, was done by the class.

3. A class in stock breeding and practical agriculture, numbering twenty-five students of the second year, to whom instruction has been given, partly through lectures and partly from Dr. Miles' Principles of Breeding. This class has made very thorough work with the subject of stock breeding, beginning with reproduction and ending with the form and characteristics of breeds. Under the head of practical agriculture, are included such subjects as Farm Implements, Simple Tillage, Application of Labor, Hoed Crops, and Stock Raising. The class has been required to make a critical examination of the College herds, thus familiarizing each student with the characteristics of the different breeds, and finally to mark according to a scale of points upon the individuals of each breed. This subject, stock breeding, is one of great interest to students; and it certainly is of overshadowing importance to the farmers of Kansas. It is therefore to be regretted that the College does not possess a few specimens of each of the prominent breeds of cattle and sheep. In particular, it would be greatly to our advantage for study to own pairs of each of the following breeds: Hereford, Angus, and Ayrshire cattle, and Merino and Cotswold or Lincoln sheep.

4. A class in physical geography of ten students, mainly of the third and fourth years. The text-book in use is Guyot's well-known work.

5. A class of fourteen students of the third year, in rhetorical exercises. This class has received regular weekly drill during the spring term in composition and declamation, and in the study of the principles of the rhetorical art. The progress made by the class was quite satisfactory. At the late Commencement Exercises, four of the members of this Class were selected to take part in the exercises of the under-graduates' exhibition. It is gratifying to me to know that measures have been adopted, looking to more regular and thorough work in this important branch.

Such, briefly, is a general statement of the work of instruction done. But it should be remembered that a teacher's work can never be fully reported. Something of the range and scope of the work may be indicated, as I have attempted in this report; but the actual work done can only be shown in the every-day drill of the class-room and in the after-lives of the students.

In addition, I have had editorial charge of our College paper, the INDUSTRIALIST; and have given to it whatever time has been at my disposal.

THE FARM.

In general, the circumstances of the season have been very favorable to agricultural operations. The dry weather which prevailed during the latter part of last winter and early spring, materially injured a promising crop of winter wheat, and later, some sorts were damaged by chintz bugs,—the facts to which must be attributed the low yield of wheat obtained the past season. But aside from this partial failure of the wheat, all crops have been grown and harvested under favorable circumstances; and the results have been satisfactory.

The general results of the season's cropping may be compactly shown by a tabular statement given below:—

CROPS.	No. of acres.	Yield per acre, bus.	Yield per acre, tons.	Cost per bushel.	Cost per ton.
Corn	22.50	47	.....	14c	
Wheat, winter	17.00	13	.....	54c	
Oats	16.00	30	.....	23c	
Millet	11.00	.....	2.09	.....	$2 13

This table embraces only those crops grown in quantity such that accurate and fair accounts could be kept with each. A number of other products have been grown in small detached pieces, of which I am unable to report accurately. Among these are about eight tons of "tame hay," cut chiefly from lawns; a very large yield of pumpkins, grown from about half an acre of land, and fed out during the season; about two-thirds of an acre of Golden millet, from which seventeen bushels of fine seed were obtained, and a small amount of clover seed, which has not yet been threshed.

It is my duty to call the attention of the Board to the fact that, while the demands upon the College farm are constantly increasing, its size and consequent ability to meet those demands, diminishes from year to year. Thus the rapid increase in the numbers of our students, the necessity for performing more of experimental work, and the great increase in the College herds, are constantly creating fresh demands upon the farm. At the same time, the buildings and lawns already occupy nearly or quite ten acres; and this ought to be considerably increased during the coming year by the development of ornamental grounds. At the present time, the total area of arable and pasture land in use by this department, upon the lower farm, is less than 110 acres. I therefore earnestly ask the Board to take into account the advisability of increasing the area of the College farm.

FENCES AND BUILDINGS.

The work upon fences and buildings has been chiefly given to maintaining repairs. By the advice of the President and Faculty, I have permanently closed the west entrance to the College farm, by continuing the stone wall across the gateway. As the lane extending from the rear of the College buildings is now useless, except to foot passengers, I propose, with the consent of the Board, to return this lane to the field which it crosses, by removing the south fence, and prolonging the cross-fences to the hedge on the north side of the lane. The stone wall surrounding the farm has received considerable repairs; some slight repairs have been made upon the barn; and the platform scales have been raised, to prevent the constant inundations to which they have hitherto been subject.

STOCK.—Of work animals, the farm now owns five head, three mules and two horses. One of the horses has been added since my last report was made. Of cattle, the College owns two breeds, and of swine two, as follows: Short-horns 17, 15 females and one bull; Jerseys 5, four females and one bull; and of cross-bred cattle, one heifer. The Berkshire swine number eleven breeding animals, nine sows and two boars, and twelve "stock" hogs: of Essex swine, we have three youug sows. During the summer, by the advice of the Board, I purchased in Illinois a young Short-horn bull to head our herd. In this, I consider myself to have been peculiarly fortunate, having secured a young bull of the "Constance" family, an animal of great promise individually, and of excellent breeding. We are under obligations to Messrs. A. M. Winslow's Sons, Kankakee, Illinois, the breeders of this animal, for a very liberal reduction in the price. In consequence of the sale of our old Essex boar, which had become useless to us, we are without male representation of this breed.

Our stock of all kinds has done remarkably well during the year. Disease has been hardly felt in the herds, and the general condition of the stock is very promising.

It is an interesting fact, and one that speaks well for our Kansas soils, that this 27 head of cattle and 5 horses, to say nothing of the swine, have been maintained from the produce of this farm of less than 130 acres, giving little more than four acres to each animal; and I am of the opinion that during favorable seasons it will be possible, with our present system of cropping, to make three acres carry one head of cattle. This would be considered a valuable result under any ordinary system. I desire, in concluding this subject, to call the attention of the Board to the fact of the general awakening of our farmers to the importance of sheep husbandry, and to state my convictions that the College should not be behind in this matter, but that it ought to number in its "illustrative apparatus" representatives of at least two breeds of sheep,—say Cotswolds and Merinos.

EXPERIMENTS.—Our work in this direction has been confined to tests of different kinds of grains and grasses. Of winter wheat, five sorts—namely, Early May, Golden Straw, Silver Chaff, Arnold's Gold Medal, and Fultz—have been tried on a considerable scale. The yields per acre were as follows: Golden Straw, 7⅔ bushels; Silver Chaff, 8⅓; Arnold's Gold Medal, 6⅓; Early May, 13. The first three of these were grown in plats of one acre each; of the Fultz, one-half an acre was grown; and of the Early May a much larger amount. From an accident in threshing, I am unable to give more than an estimate of the yield of the Fultz. It promised a less yield than the Early May, and rather more than the other sorts. The quality of the Gold Medal, Golden Straw, and Silver Chaff was very inferior. Indeed, it was so shrunken and worthless, that I became satisfied that it would be valueless for seed. From the fact that in the previous year these new sorts gave large yields of superior grain, we are admonished that the results of a single season are of little worth in determining a

question of this sort. Of the considerable number of sorts tried by us during the past six years, none have proved equal to the red Early May.

Of corn, three sorts have been grown,—Yellow Dent, Wright's Golden Yellow, and the small red sort called King Philip. The yield of each was as follows: Yellow Dent, 41.7 bushels; Wright's Golden Yellow, 63; King Philip, 53. Wright's Golden Yellow is a new sort, the seed of which we obtained from Mr. Wright, Mt. Pulaski, Illinois. In appearance it resembles the common Yellow Dent, but it ripens somewhat earlier; and we have no hesitation in pronouncing it a very promising sort.

Our experience with the tame grasses has been quite satisfactory, and fully confirms what I have said in previous reports on this subject. For pasture, orchard-grass has proved superior to all others tried, though perennial rye-grass, alfalfa, and clover have given good results. For mowing, alfalfa and red clover have given greatest satisfaction. The experiments have been given in detail, in the columns of the INDUSTRIALIST, from time to time; and have been extensively copied by the newspapers, East and West.

This department is indebted to Prof. W. J. Beal, Lansing, Michigan, and Prof. W. R. Lazenby, Ithaca, New York, for fine collections of seeds; to Mr. Wright, Mt. Pulaski, Illinois, for one peck of his Golden Yellow corn; and to Messrs. C. A. Crosby & Co., Kansas City, Missouri, for one of their very excellent spring-tooth harrows.

We have now in progress experiments as follows: (1) With wheat, to test the comparative value of harrowing during the growth of the plant, harrowed strips alternating with an equal number which have received no special treatment; (2) in the growth of different sorts of grains, fodder plants, and roots, including several varieties of common corn and rice corn, a number of sorts of common millet and pearl millet, seven kinds of wheat and barley and four of oats, five sorts of mangle wurzels, and two sorts of Southern cow peas; and (3) experiments in feeding of pigs, to be completed during the coming fall. The results of these experiments will be laid before the Board in proper time.

FINANCIAL STATEMENT

Of operations on the College farm, for eighteen months ending June 30, 1880.

DEBIT.

To vouchers approved	$2,389 38
To amount of produce on hand, Dec. 1, '78.	827 80
Total	$3,217 18

CREDIT.

By amount of sales of stock and produce..	$2,014 82
By amount of produce on hand, June 30, 1880	442 05
By amount of increase of live stock	775 00
By amount paid for herd-books and office furniture	34 25
By amount expended on College grounds.	83 95
By amount expended for experiments....	66 25
Total	$3,416 32
Balance	$199 14

ABSTRACT OF INVENTORY.

Horses and mules	$ 450 00
Cattle:	
Short-horns	3,550 00
Jerseys	525 00
One cross-bred	25 00
Swine—Berkshire and Essex	730 00
Implements and harness	920 45
Grain—150 bushels corn	37 50
Crops on ground:	
Wheat, 18 acres	96 05
Corn, 30 acres	130 10
Oats, 5 acres	10 60
Millet, 20 acres	73 60
Grass land seeded	27 95
Experimental grains and grasses	66 25
Office furniture and herd-books	341 25
Total	$6,983 75

Respectfully submitted.

EDWARD M. SHELTON,
Prof. of Agriculture, Sup't of Farm.

THE A., T. & S. F. and the K. P. Railroads have offered the Topeka Library Association $25,000 for the purpose of erecting a library building, with the provision that the Legislature appropriate one of the four corners of the Capitol square for the purpose. It is probable that the Legislature will refuse to grant the corner asked for.

SEVERAL parties in the East are making very earnest inquiries about our cotton crop the past season, and what we mean to do in the future in regard to the project. The result of last year's cotton crop was so satisfactory that a great number of our farmer friends are encouraged to try it this year, being satisfied that it will prove a better-paying crop than either wheat or corn.—*Oswego Independent.*

THE INDUSTRIALIST.

SATURDAY, FEBRUARY 5, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Relation of Government to Science.

The February number of *Scribner's Monthly* contains an article by Charles Barnard upon Agricultural Experiment Stations. The portion upon the relation of the government to science is especially valuable. It should be read by all our people. Did space permit, we should give the article in full; but, since this is out of the question, we call attention to the article, and make a synopsis of some points, and supplement with a few extracts.

In illustrating the relation of the government to science, two cases are cited. The first is the work of the Fish Commission, in studying the habits of the cod. The scientists sent out continued to dredge, to lower thermometers, to catch the cod, and to breed the young fish until they were able to tell the fishermen that "the cod eats this or that; he spawns at such a time; he avoids this place because the water is too cold or too warm. To catch cod you must do this or that. These things are positive facts, tested in a scientific manner, patiently, thoroughly, and completely, without regard to time or expense. Cod-fishing is not blind luck: it is a science." As a further illustration, the well-known investigation of the properties of the sumac is given. The sumac leaves are gathered in autumn, and are used in tanning. The American leaves contained much less tannin than the imported ones; and there was the further drawback that the American product discolored the leather. The Department of Agriculture sent out a trained scientist to experiment on the plant. The result, though simple, is of incalculable value to all the people. If gathered in June, the leaves contain more tannin than those imported; and they do not discolor the leather. To these given in the *Monthly*, many other illustrations might be added, all going to show that whenever the state has supported scientific investigation,—whether it be in mineralogy, geology, zoology, or chemistry; in testing new crops or new methods of treating old and well-known ones,—there has invariably been a cash gain to the people, compared with which the expense is infinitesimal. One will be added. Parties interested, a few years since, tried to discriminate against wheat raised in the middle and western States, on the ground that it may have been raised on fields where Paris green was used to kill potato beetles; and that there was danger of the arsenic entering the soil, and being absorbed by the wheat. Thorough tests were made by applying the Paris green to the soil, and analyzing the wheat grown thereon. No arsenic was found; but it was demonstrated that the soil contains substances with which the arsenic unites and is rendered insoluble. In fact, by no possibility can the wheat be contaminated. This enhanced the value of every bushel of wheat sold since then.

But upon the cases cited in *Scribner*, the author remarks:—

"The 'Fish-hawk' [the vessel sent out by the Commission] makes cod-fishing more secure and more profitable. The Department of Agriculture, by sending out its observer to experiment on the sumac, adds tens of thousands a year to the income of the State of Virginia. The fisherman and the sumac-gatherer have neither the time, the knowledge, nor the skill, for such work. They cannot even afford to pay a man to do it for them. Their business is to fish or gather leaves. Some one else must make experiments.

"The United States Fish Commission may be regarded as one of the signs of the times. While it is purely a scientific body, composed of scientific men, and apparently working wholly for scientific objects, it is really of the greatest practical value to the people. It does a work no single individual or trade can perform. It makes experiments. It examines and compares the known, and, from this, reasons to the unknown; and presently the unknown is for the benefit of all men. Much of the work performed on the decks of the Fish-hawk seemed to the fishermen idle and foolish. What is the use of dragging the sea for new worms and periwinkles? Of what avail are these hundreds of bottles filled with useless, crawling things? But one day the dredge brings up from the depths far below the longest fishing-line, a new fish—a good, solid flounder, a fish without name, but good to sell, and wholly admirable after it has come out of the frying-pan.

"Scientific research and experiment must of necessity be followed without regard to profit. To experiment is to ask questions of Nature—not to seek gain. Only a government can afford to be scientific; and it is the duty of our Government, both State and national, to pursue science for the people. So well is this recognized that several of our State legislatures have appropriated, or propose to appropriate, money for scientific experiments for the benefit of agriculture."

Our State is early reaching that stage in which the encouragement of our various industries is demanded. This is notably seen in the requests for State aid in establishing the sugar industry. We think that whatever may be said upon the policy of paying a premium for the production of sugar from any variety of cane, it is the plain duty of the state to foster all scientific research that benefits all the people. The result of experiments so far, have been somewhat discordant. While it is true that experiments and investigations seem to show that the cane crop does not promise much to the farmer of New England, we are not justified in accepting this as final for this State also. Our soil and climate may be so different that the very sugar-producing plant that will fail in New England will be a great success here. We hold that next to the protection of life and property, it is the first duty of the State to support all those scientific and experimental labors which, to attain the best results, must not be undertaken for individual profit. Immediate cash returns to the individual, must, from the nature of the case, be the incentive to individual effort. No man nor company of men can do the work in the satisfactory manner in which it can be done by the state. The expense is inappreciable when borne by the whole people.

The great benefits that are derived from scientific investigations, would be enjoyed generations before they are, if a more liberal policy were pursued toward original research upon those things pertaining to our every-day life.—*Prof. Failyer.*

Our Exchanges.

Hon. Geo. W. Glick, of Atchison, furnishes the *Farmer* the following recipe for blackleg: Equal parts sulphur, saltpetre, cream-of-tartar. Mix one teaspoonful in bran, night and morning.

Every Kansan is interested in the State Historical Society, and will be gratified to read the account, in the telegraphic columns, of its rapidly increasing collection of historical articles.—*Leavenworth Times.*

The deputy collector of internal revenue paid our town a visit last week; and while here, said more liquor was being shipped here now than to any neighboring town. This needs investigation.—*Council Grove Republican.*

The novelty of shearing sheep by machines will be presented at Russell on the 13th of April, at the fair grounds. On that day, a sheep-shearing match will be held by the central Kansas wool-growers, representing about 40,000 head of sheep.—*Marion County Record.*

An old coon from the country sold twenty pounds of butter in the city Saturday, getting therefor 20c per pound. On examination, the centre of each roll was found to be anything but butter. Salt, lard, raw pork and other articles of farm life constituted the larger part of the supposed butter. The honest old granger has until next market day to make things even, otherwise his name will be revealed to a butterless constituency, and trouble commenced at once against him under the oleomargarine law.—*Abilene Gazette.*

Cattle men report that, owing to the continued severe winter and the consequent poor condition of the cattle on the range, they fear heavy losses before grass comes in the spring. Some few cattle have already died, but the number is not serious, as will be the case if spring does not open very shortly. Cattle have drifted very badly the last two months, towards the south and east, and all efforts to keep them on individual ranges, have been abandoned; and the cattle men have combined to prevent them from drifting below certain streams in the territory.—*Anthony Republican.*

Educational Gossip.

Sunday afternoon lectures have become so popular with the Olatheans, that they are likely to be continued.

The Atchison schools are minus three hundred children and four teachers. Cause: mumps, measles and bad colds.

The second term of the Ottawa University opened Wednesday, January 26th. The school is in a flourishing condition. The total enrollment for the fall term was 82.

Hon. J. G. Schnebly's text-book bill has received a good deal of attention by the Kansas press. It is being advocated by many papers and educators, but will not become a law this time.

Hon. E. H. Funston has introduced a bill into the State Senate, "to make diplomas from the Normal Department of the University of Kansas, lawful certificates of qualification to teach in common schools." The bill will probably become a law, as it ought to.

Prof. Wall, once of this place, is now teaching school near Bull City. He chastised a pupil a few days ago; and a big brother of the pupil came and demanded satisfaction. A war of words ensued, which ended in the teacher "going for" the aforesaid big brother, and chasing him off the premises at the point of his tooth-pick.—*Stockton News.*

Speaking of defects in the management of district schools, the Sumner County *Press* mentions the following as the most prominent: "Not a single district in the county pays its obligations as they mature. Ninety per centum of the teachers are compelled to discount their orders or wait several months for their salaries. This is an evident injustice to the teacher, because it is a violation of a legal contract. It is also an injury to the district, because they are thereby compelled to pay higher wages for their teachers. Any teacher would prefer thirty dollars in cash to thirty-five dollars in depreciated school orders. The paper-shaver is the only one who profits by the prevailing custom. The district is compelled to pay its debts first or last, and why not do so on time?

Representative Nathaniel Green, of Riley, has introduced a bill into the House, amendatory of section 3, article 2, chapter 122, of the laws of 1876, which provides that the superintendent of education for each county, shall visit every school in his county as often as practicable, and once in each term, and acquaint himself thoroughly with their workings, make suggestions in private to each teacher, note the character and condition of each school-house, its furniture and apparatus, making his reports to the district board; examine the accounts and records of each district treasurer and clerk, and see that they are kept in a business-like manner; aid the teachers in all proper efforts to improve themselves; keep his office open at least one day in each week, at the county seat; hold public meetings for the purpose of discussing school questions before the people, for which purpose he shall visit each district; shall make daily inspection of the teaching and records of the normal institute when it is in session; shall make a general report to the superintendent of public instruction for the State, on the last Monday in March and December.

THE INDUSTRIALIST.

SATURDAY, FEBRUARY 5, 1881.

Some ten or a dozen magnificent Austrian pines have reached their final destination in the College campus, during the week.

The weather prognosticators, Vennor, Tice, *et al.*, "come up smiling" with a bran new batch of "predictions" for February. But, brethren, what we want is an explanation of the little joke you played on us last month.

The Lawrence *Home Journal* has never missed a weekly visit at this office, during the life of the INDUSTRIALIST, we believe; and we hope it never will. We always read the *Journal* with pleasure, because of its well-expressed, sound, conservative views of men and things.

The U. P. Railway Company favors all attending the Breeders' and Farmers' Institutes with reduced rates, one and one-fourth fare for the round trip, on the line of that road. We confidently expect to be able to announce similar favors from the A., T. & S. F. Co., next week.

Viewed through our little spy-glass, from the commanding position of the INDUSTRIALIST office, the picture now on exhibition in Manhattan, representing the lachrymose editors and aggrieved singers "weeping down each other's bax," as Nasby would say, is touching in the extreme.

Within the past two days, it has been very hot and intensely cold. It has rained a little and snowed some, we presume, "in places;" and, in addition, we have, during this week, had a very cold south wind, and a warm one from the north. To-day, if you must have something positive, is, —well, a "reg'lar weather breeder."

The Chicago *Inter-Ocean* is one of the best papers in the country; and its educational department, in point of completeness and general interest, surpasses anything of the kind that we are acquainted with. These friends, however, are somewhat astray, when they refer to the Breeders' Institute as having *been* held on the 15th and 16th inst. See programme in another place.

The Breeders' and Farmers' Institutes to be held in this place during four days, commencing February 15th, promise to be very successful meetings indeed, judging from the number of cordial letters received by the secretaries, from prominent farmers and stock-raisers in this and other States. Similar meetings should, and at no distant day will, be held every winter in all the principal towns of the State.

Hon. M. M. Miller, of Clay Center, writes as follows concerning a Berkshire purchased of the College some three years ago: "The Berkshire boar purchased of the College, went to the shambles last fall, after a long life of usefulness. He weighed 600 lbs. in only fair condition, and fetched $20. It pays to buy the best." The above is a sample of many kind letters received from purchasers of stock, in different sections of this and other States. The College farm will send out nothing that is not believed to be first class.

WEBSTER HALL, Jan. 29th, 1881.

Society opened with roll-call and devotion. Debate, conducted by M. T. Ward and Chas. Marlatt on the affirmative, and F. A. Hutto and O. G. Palmer on the negative, was decided in favor of the affirmative. The Society then passed to the order of extemporaneous speaking, after which the ever-welcome *Reporter* was presented by H. L. Call. Committee on programme failing to report, the President appointed Messrs. Neiswender and Fairchild for debate next session. Mr. Neiswender chose as his assistant Mr. Knaus; Mr. Fairchild chose Mr. Meek. Question, "*Resolved*, That the United States exerts more influence than any other power." *Reporter* will be presented in two weeks by Mr. Hutto. After reading of minutes and report of critic, Society adjourned. CALL.

SOCIETY HALL, Feb. 4th, 1881.

Alpha Beta Society called to order by the President. The question debated was, "*Resolved*, That ambition has caused more misery than superstition." The judges decided in favor of the negative. Extemporaneous speaking was then in order, and was quite interesting. After a recess of five minutes, the Vice-President, Mr. Short, took the chair, and the Society was favored by a declamation by Mr. VanFossen, essay by Miss Hopper, and a select reading by Miss O'Meara. A committee on moot-court reported progress. The names of Misses Florence and Carrie Donaldson, and Mr. J. F. Stricker, were proposed for membership. The question for debate next week is, "*Resolved*, That young ladies, as a rule, have more advantages in life than young men." Affirmative, Mr. Richardson and Miss Hopper; negative, Mr. Miller and Miss Selden. PHOSPED.

THE BREEDERS' INSTITUTE.

Below we give the programme of the Breeders' Institute, to be held in Manhattan on February 15th and 16th. It now seems certain that every paper and address named will be given, and in the exact order named:—

FEBRUARY 15TH, 2 P. M.

The Relations of Sire and Dam—PROF. E. M. SHELTON, State Agricultural College. Discussion opened by Dr. Wm. Vail, Wm. Hallowell.

The Milking Race of Jersey Island—DR. WM. T. VAIL. Discussion opened by Dr. O. F. Searl, J. Q. A. Shelden.

7:30 P. M.

The Races of Cattle Suited to the Topography of the Diverse Farms of Kansas—DR. CHAS. REYNOLDS, Fort Riley, Kansas. Discussion opened by Major F. D. Coburn, Prof. E. M. Shelton.

The Rearing of Calves—WM. WATSON, Beecher, Ills. Discussion opened by O. W. Bill, J. J. Mails.

Short-horn Families and Pedigrees—WM. HALLOWELL, Durham Park, Kans. Discussion opened by Gen. J. C. Stone, C. E. Allen.

FEBRUARY 16TH.

The forenoon will be devoted to visiting the Agricultural College and herds of the vicinity, along a specified route. Conveyances will be furnished, as far as possible.

2 P. M.

Kill Your Curs—MAJ. F. D. COBURN, Topeka, Kansas. Discussion opened by Prof. M. L. Ward, J. S. Codding.

The North Devons—GEN. L. F. ROSS, Avon, Illinois. Discussion opened by Dr. Reynolds, Maj. Coburn.

Some Obscure Points in Breeding—D. S. LEACH, State Agricultural College. Discussion opened by Maj. D. W. Crane, Dr. W. T. Vail.

7:30 P. M.

Considerations on the Management of Fairs—GEN. J. C. STONE, Leavenworth, Kansas. Discussion opened by A. W. Rollins, C. E. Allen.

The Draught Horse—DR. EZRA STETSON, Neponset, Illinois. Discussion opened by John Drew, S. A. Sawyer.

The Sheep for Kansas—J. S. CODDING, Louisville, Kansas. Discussion opened by Mr. Jones, Dr. Chas. Reynolds.

FARMERS' INSTITUTE.

The annual Farmers' Institute, to be held Feb. 17th and 18th, 1881, immediately follows the Stock-breeders' Institute noticed above. The programme is as follows:—

THURSDAY, FEB. 17TH, 10 A. M.

Wheat—Mr. WM. F. ALLEN.

Stock-feeding—Messrs. H. H. HOPKINS, O. W. BILL and H. KEARNS.

2 P. M.

Fruit Culture—Messrs. G. C. HOWARD and T. C. WELLS.

The Horse for General Farm Purposes—Messrs. JNO. WARNER and R. H. KIMBALL.

7 P. M.

"*The Kansas King*"—Rev. CHAS. REYNOLDS.

Co-operation among Farmers—Prof. M. L. WARD.

FRIDAY, FEB. 18TH, 10 A. M.

Profits of Timber Belts—Rev. E. GALE.

Fish Culture in Connection with Agriculture—HON. D. B. LONG, Fish Commissioner.

2 P. M.

Election of officers.

Reports of committees.

Possibilities in Kansas Farming—Mr. WASHINGTON MARLATT.

7 P. M.

Food Values by Chemical Tests—Prof. G. H. FAILYER.

The Farmer's Home—Pres't G. T. FAIRCHILD.

On the evening of February 1st, the Parliamentary Drill Club held its third meeting in Society Hall. The Club, which, by the way, is composed of the best talent of both the Webster and Alpha Beta Societies,—a matter of no small significance,—with an additional representation from the Faculty of the College, to give it a dignified air, is now thoroughly organized; and it supplies a felt want in the harmonious working of the machinery of this practical educational institution. President Stewart, with gavel in hand, signified the arrival of the hour for the outpouring of "thoughts that breathe and words that burn," from minds primed with chunks of wisdom which, like the "great Vesuvius," threatened serious disaster to the safety-valves of the possessors thereof, unless a fitting opportunity was presented for relieving the pressure. The committee on jurisprudence begged the leniency of the Club, and an extension of time to perfect their report, which, being granted, assuaged their fears of an execution of the penalty to which they had laid themselves liable. By request of a member, the Constitution and By-laws were read by the Secretary, Miss Ida Cranford, when several additions were made to the roll of membership.

In the election of a new president and marshal, also a reporter, considerable knowledge of parliamentary tactics was displayed: the better informed members, apparently arrayed in two opposing factions, "crossed swords," by disputing each point, in accordance with Roberts' Rules of Order. The contest resulted in the choice of Geo. E. Hopper for president; A. A. Stewart, marshal; and M. H. Markcum, reporter. The usual valedictory and inaugural followed, which proved to be one of the most entertaining features of the evening's exercises. While in the chair, the ex-president acquitted himself creditably, and displayed fine abilities as a parliamentarian. Messrs. Stewart, Markcum and Dunn, were appointed a committee to prepare a programme for next meeting. It is impossible to do the exercises of the Club justice, in the limited space of the INDUSTRIALIST. Come out Tuesday evening, and learn something about motions, amendments, points of order, privileged questions, and "sich."

HORATIUS.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procure books before coming can learn what are used by inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

KANSAS STATE
AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductiye. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles pf plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is to lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, FEBRUARY 12, 1881. No. 26.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. I. D. GRAHAM, President.
G. H. FAILYER, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Report of Department of Higher Mathematics and English.

1878-9.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—I respectfully submit for your consideration an outline of the work done in the Department of Higher Mathematics and English, for the collegiate year ending June 30th, 1879.

TABULAR VIEW OF CLASSES.

STUDIES.	Males.....	Females....	Totals by classes...	Totals by terms.....
FALL TERM, 1878.				
Geometry	7	1	8	
Rhetoric (two divisions)	62	23	85	
Political Economy	10	2	12	
	79	26	.....	105
SPRING TERM, 1879.				
Surveying	7	...	7	
English Structure	42	6	48	
English Literature	22	15	37	
Logic	10	2	12	
	81	23	.....	104
Total during the year				209

My work in teaching has been four recitations daily during the whole year. In the discharge of my duties as a professor, I will simply say that I have done the best I could under the circumstances. The duties unexpectedly devolving upon me, as acting executive for the greater part of the year, often demanded the time that I should otherwise have used for the benefit of the individual pupils under my instruction.

The classes in rhetoric were composed principally of new students too far advanced to be placed in the English drill of the first year, and not prepared to take rhetoric proper. This difficulty occurs at the opening of every year. In my opinion, an introductory year's course should be established, and the standard for admission to the first year be raised.

The classes were drilled in composition and criticism, after they had passed over the elementary principles of rhetoric.

Some attention was also paid to elocution, each member being required to declaim several times during the term.

The class in political economy went through Wayland's Treatise, recast by Dr. Chapin. During the term, each member of the class wrote two essays or orations, which were read or recited in chapel before the Faculty and students. The themes of these papers were suggested by topics discussed in the class-room.

The class in English literature manifested an unusual interest in that study. At the suggestion of their teacher, the class read contemporary English history, nearly every member providing himself with a copy of Green's History of the English People. Essays on historical and literary subjects were frequently required. These essays were read by their authors before the class, criticised, and discussed. In the preparation of these essays, a desire for reading and investigation was awakened to a degree far beyond the capacity of our present library to gratify. Whenever the minds of youth are thoroughly imbued with a desire for knowledge, books are in great demand. They become an imperative necessity in the work of education. It is at this period of life that the taste for reading is set, and the fashion of the intellectual life is shaped. I would again urge the importance of replenishing the College library.

The results that have followed the teaching of the two classes in English literature, have been exceedingly satisfactory, and attest to the wisdom of inserting it in the course of study. During the first term of the year, algebra, which belongs to my department, was taught by Prof. Platt, in order that I might take charge of the class heretofore taught by President Anderson. The class in algebra passed over the usual course for one term. It would doubtless be for the interest of the student to give two terms, at least, to algebra.

The third and fourth-year classes have received instruction in elocution from different members of the Faculty. Rhetorical exercises have been held daily during the year, two members of the classes named above, appearing every morning in chapel with an oration, essay, or declamation. As a result of this drill and practice, the young people who took part in the late commencement exercises, were enabled to acquit themselves with credit.

The great want of the Department of Higher English, is works on literature, and for reference, in the College library.

Respectfully, M. L. WARD.
Manhattan, Kansas, June 30, 1879.

1879-80.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—I respectfully submit an outline of the work done by myself in the Agricultural College, since the date of my last annual report.

During the summer vacation, and until December 1, 1879, the duties connected with the Executive Department devolved upon me.

As Loan Commissioner, I have invested in the school bonds of sixty-eight school districts, thirty-nine thousand three hundred and seven dollars and eighty-three cents ($39,307.83) of the endowment fund.

The general oversight of the College library has devolved upon me as Librarian.

During the entire year, I have taught four classes daily, a tabular view of which I here present:—

TABULAR VIEW OF CLASSES.

STUDIES.	Males.....	Females....	Totals by classes...	Totals by terms.....
FALL TERM.				
Algebra (two classes)	37	12	49	
English Structure	32	8	40	
Political Economy	5	7	12	
	74	27	.....	101
WINTER TERM.				
Trigonometry	14	...	14	
English Drill	26	10	36	
English Analysis	35	16	51	
English Literature	28	12	40	
	103	38	.....	141
SPRING TERM.				
Algebra	32	5	37	
Surveying	11	...	11	
English Composition	17	15	32	
English Literature	22	9	31	
	82	29	.....	111
Total during the year	259	94	.....	353

The methods of instruction followed in my department have been presented in former reports. Respectfully, M. L. WARD.
Manhattan, Kansas, June 30, 1880.

Mr. Robert McCall, of Industry, brought five head of pure-bred Leicester sheep from Canada less than two years ago. He now has a nice little flock of thirteen. The fleeces averaged 14 pounds last year.—*Abilene Gazette.*

Our Exchanges.

Immigration is beginning to arrive. We will have the biggest boom the coming summer we have ever had.—*Hutchinson News.*

The citizens of Ottawa are afraid of the great comet. Intense religious excitement is being manifested by the most abandoned sinners: even editors and lawyers are crowding into the houses of worship.—*Exchange.*

Saline county has 3,000 voters, and, in addition to this, has 500 women tax-payers. Out of this number, the Commissioners find 1,287 parties paying real estate and personal tax. This would show 1,833 voters in this country who pay no taxes, personal or otherwise.—*Journal.*

Reports come from the Canadian that several cattle men have lost heavily during the late storms. Toney, Day & Co., who are holding cattle on the north Canadian, are reported to have lost nearly 800 head. One other firm is reported to have lost nearly 400 head.—*Medicine Lodge Cresset.*

Heavy losses of sheep from the cold and snow storms, are reported in the Fort Concho county. In many instances, shepherds were forced to abandon their flocks on account of the excessive cold; the result being a general mixture of stock, and scattering over the country.—*Dodge City Times.*

A company has been formed in New York City for the manufacture of sorghum in Kansas, with a paid-up capital of $5,000,000; and, with the most approved machinery, will be ready for operation the coming season. The company will operate largely in Kansas, and will make Hutchinson the headquarters of the State. Within ten days or two weeks, a member of the company will be here and complete arrangements for manufacturing sugar during the coming fall.—*Hutchinson Interior.*

Mr. Chas. Knight, one of Morris county's sheep men, informs us that his sheep are in fine condition, notwithstanding the cold weather. This only confirms the reports of other sheep men in the county, who concur in the statement that their sheep are in fine condition. Morris is unquestionably one of the finest counties in the State for sheep husbandry; and it is only a question of time, when the luxuriant uplands of the county will be covered with countless herds of these valuable animals.—*Council Grove Republican.*

The sergeant-at-arms of the House, and also the Senate, have consented to receive subscriptions for the above fund. One hundred and forty dollars and eighty cents have already been collected, mostly at the *Commonwealth* office; and all of it has been credited, and the names of the persons who have subscribed have been published in these columns. All who give in the future will also be noted and the amount given. The object is to erect a monument over the grave of Mr. Gray, in the Topeka cemetery.—*Commonwealth.*

Some years ago a company, organized at Ft. Scott, bored to the depth of 461 feet, seeking for petroleum. They didn't strike what they were after. But, at the depth of twenty feet, they struck a two-foot vein of coal; at sixty feet, a four-foot vein of coal; at one hundred and fifty-seven feet, another four-foot vein of coal; and at a depth of three hundred and ninety feet from the surface, a vein of pure and black coal eleven feet in thickness. All the shafts sunk in this State—and very many have been sunk in the eastern counties—show that coal can be obtained in veins thick enough to make its mining a profitable business. It is to be hoped that a coal mining company will be organized in Atchison at an early day.—*Atchison Champion.*

THE INDUSTRIALIST.

SATURDAY, FEBRUARY 12, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

THIS week has been the hardest on stock in Kansas for many years. First, there has been an icy rain for several days, then a short thaw, followed again by a furious snow-storm, raging still with no signs for a change. The whole month of January and a good part of December was extremely cold; and, to make the season still more destructive for stock, there is in many quarters, a lack of hay, and on the frontier even a lack of corn. Two days ago, we read in the papers of the western Arkansas Valley, of the perishing of whole herds; and this storm will undoubtedly increase starvation at a fearful rate, especially among cattle brought here in large herds from the South.

In this part of the State, there is no lack of feed for farm animals, although hay and corn are of a less than average quality. But one thing is lacking in Kansas, east and west,—suitable shelter. Not one-third of farm animals have suitable winter quarters while fully one-third have none but the shady side of a rough stone wall or a rail fence. It would be unreasonable to expect a "New-England barn" on every quarter-section; but this winter teaches wholesome lessons to many a farmer. Many a one will learn that Kansas is no Italy, that a farm barn is an excellent thing, that it pays to keep a few head of cattle less in order to give the rest a decent shelter, and that saving is making. Josh Billings says, "Johnuary and Febuary iz the poor fellows munths uv good rezolushuns."—*Prof. Walters.*

American Schools of Design.

The number of those who have shown practical interest in art education in this country is very small, if viewed in the light of the immense importance of the subject. The government does absolutely nothing in this direction. On the contrary, by imposing a tariff of fifty per cent upon art importations, it even prevents our artists from sending abroad for educational collections,—it deprives invalids from buying crutches. Little more is being done by State legislatures. A few of these have provided for the introduction of drawing into the public schools; but, having no qualified teachers for the new study, and no normal institutes and few good books to aid them, these laws remain dead-letters. The only State that has made an exception in this, is Massachusetts, the leader in so many progressive movements.

A few States and cities have provided for schools or departments of design in their State universities and colleges. Among such institutions, may be named the Boston Polytechnic School, Cornell University, Yale College, and the universities of Michigan, Illinois, Cincinnati and Rochester. In most other public institutions, the schools of design are simply drawing departments viewed with the microscope. Schools of design, to be successful, should possess extensive collections of paintings, drawings, engravings, statuary, antique ornaments and dresses, porcelain and pottery, etc. These collections cost money and a great deal of effort, and must necessarily be rare in young institutions.

Under such circumstances, it is very gratifying to hear of individual efforts of a high order. Mr. Peter Cooper, the well-known New York philanthropist, has founded a school of design, which is attached to the Cooper Institute. It is provided with every means that could be expected of a young school, and has already accomplished excellent results. Mr. James A. Claghorn, with some twenty-three other gentlemen of Philadelphia, contributed over two hundred and forty thousand dollars for the erection of a very handsome building and the establishment of an art school known as the Philadelphia Academy of Fine Arts. Mr. Longworth, of Cincinnati, has given one hundred thousand dollars for the support of the school of design connected with the University of Cincinnati, a school which has attracted a good deal of attention in this country of late years, on account of its original boldness in teaching design. It is said that it has few superiors in Europe. Mr. Lick, of San Francisco, has also bequeathed a large amount of money for the endowment of an art school in that city. Besides these private benefactions for the express purpose of instruction, there are several institutions which, although organized to elevate the taste and interest of the masses, have also a direct and beneficial influence on art students. Prominent among these is the Metropolitan Museum, of New York. All students of the National Academy of Design, the Cooper Institute, and other similar institutions, have the benefit of free entrance at all times. A museum of fine arts has also been organized in Boston upon the same generous plan. Cincinnati is following.

Yet, these efforts, grand as they are, will not be sufficient to deliver us from our present state of subserviency to Europe in art matters. Our annual imports in articles of fine and industrial art, amount to much over one hundred million dollars, or about one-fourth of all our imports; while our exports in similar articles amount to less than four per cent of the grand total. These imports, too, will grow from year to year as wealth increases, unless we educate the coming generations to make them here. We should cease to export raw materials of any kind,—to sell horn and buy buttons, to sell woods and buy carvings, to sell precious metals and buy jewelry. The manufactures for which a country should especially contend are those in which labor counts much and raw material very little. "There's millions in it;" and who will estimate the moral influence which comes from the study of the beautiful.—*Prof. Walters.*

Time by the Forelock.

We have an old maxim, "Always drive your work; but never let your work drive you." If we should all follow this maxim, we should certainly be more successful in life. We have also heard of the man who had three hands,—his right hand, his left hand, and his behindhand; and the principal hand was his behindhand. Now, this man was not a successful man. It is a little more emphatically true in this rapid age than it ever has been, that anything to be well done must be done in its proper time. There is a much greater loss in doing things just a little too late than most of us are aware.

The student who procrastinates the preparation of his lesson at the proper time, gets into sad difficulties indeed. Oh, how earnestly he studies his lesson just the last few minutes before the hour for reciting, and even continues his work most persistently through the moments of roll-call, endeavoring to redeem the lost time. But it is all in vain: he is called on a part of the lesson which he has failed to carefully examine, and he is forced to answer, "Not prepared." Or, if he succeeds, by dint of his wits, in passing the recitation with some degree of credit, when examination day arrives, he finds that this hasty preparation was not the kind to stand by him, and he is doomed to a miserable failure. But the time when this student shows off at the very worst condition is on declamation day. Instead of committing his recitation a couple of weeks before time to recite, and rehearsing it nearly every day until he knows that he is perfectly familiar with it and can perform it well, he waits until the last day, and then tries to prepare. He comes upon the platform, shaking from head to foot, begins, hesitates, blushes, stammers, stops, and takes his seat without receiving a particle of benefit from the exercise, and has only excited the sympathy of the listeners.

Time will fail me to tell of the evils arising from the parson's neglect to write his sermon until Saturday night, from the lawyer's neglect to attend to the wants of his client until the case is called in court, from the physician's delay in visiting his patient, from the merchant's failure to offer his wares until the season for them is passed, from the mechanic's failure to complete his work at the appointed time, from a person's reaching the depot too late to take the train.

But, perhaps, nowhere in the whole round of business does the behindhand show more prominently, and the labor really performed yield a poorer return, than in the occupation of the Kansas farmer. If he fails to get his crops in at the proper time, he would do better, in many cases, not to plant at all. Very rarely does a late-planted crop succeed well. The rule is that, while an early seeding may succeed well, the chances are that a late seeding, although attended with all the labor and expense of the other, will bring in poor returns for capital invested. The farmer, then, of all others, should not allow this behindhand to show itself in the least.

The remedy for all these evils is to take time by the forelock, be up in the morning, be energetic and plan wisely, pushing your work just in the time in which it should be performed. Do not undertake more work than can be easily and well performed; and, by keeping ahead of your work, have time for rest and recreation. This plan not only insures success, but it brings a far greater satisfaction, even while the labor is being performed. Again we say, "Take time by the forelock."—*Prof. Platt.*

THE present winter, unless we are greatly mistaken, will forcibly teach our farmers the importance of early sowing wheat. During the thaw of a week ago, we carefully examined those plats of wheat sowed the last of September and first of October, and found the wheat badly injured, and in many instances totally destroyed. Whole handfuls could be lifted out of the ground, dead and lifeless as so much rubbish. Those plats, however, which were seeded early in September, although showing a dead and lifeless top, were sound and healthy in the "crown" and roots.

IN the school in Hingham, Massachusetts, the male students are organized into a sweeping club, and the students of the other sex into a dusting club. These clubs do the work usually performed by janitors, and receive compensation therefor. The money thus earned is expended for apparatus and other things needed in the school-room. Under the wise management of a principal who, by his example, shows his pupils how to work, these clubs have become popular; and the school supplies itself with what it needs, independent of the school board and to the great delight of tax-payers.

Let whatever farmers raise on the farm be fed to stock. Farmers of this kind will win in western Kansas.—*WaKeeney World.*

Educational Gossip.

Wichita has three large new brick schoolhouses, 16 teachers, and enrolls 916 pupils.

The last census gave the foreign population of Kansas, 199,628; and the colored, 43,789.

Peabody is having a course of lectures, given by home talent for the benefit of the library.

It is reported that the Catholics of Wamego are converting the Merritt House into a school.

Miss Brace, teacher of elocution in Vassar College, gave two evenings of select readings at Emporia.

A man near Wichita sends nine of his own children to a private school and instructs the other nine at home.

The forthcoming report of our State Superintendent will be a model,—a credit to the State and to its editor, A. B. Lemmon.

The bill making appropriations for the State University passed the House. It appropriates $29,697.12 for the year ending June 30, 1882, and $25,400 for the year following.

The Mennonites are trying to decide among themselves upon the most practical point at which to build a college. Several points have been suggested, among which are Newton and Halstead.

One of the county teachers said that he had but one visit from a school officer during two years' teaching, and that visit was made for the purpose of putting up the stove. Well done, thou good and faithful servant! —*Exchange.*

Elder Mitchell, of the Topeka *Journal*, writes a strong article in favor of school ground decoration, including also the training of the pupils in horticulture. He proposes a special teacher or trainer in this department.—*Educationist.*

The difference between the views of Kansas and Missouri on educational questions can be seen by comparing the debates of their legislatures, now in session, about appropriations for educational institutions. For neighboring States, the difference is surprising.

H. I. Dennis, who is to be State Librarian, graduated with high honors from the Michigan University; and, after being admitted to the practice of law, came to Leavenworth in 1863, where he has been editor and clerk of the district court. He is said to be a witty, racy writer.

It is reported that the Legislature proposes to cut down the salary of the Secretary of the State Board of Agriculture, now fixed at $2,000 per annum. The Secretary earns such a salary if he does his work well; and the present incumbent, Major Hudson, has thus far proved himself a capable officer.—*Champion.*

Tuesday we were shown a deed, made in 1872, in which there were ten errors. The county record of the same has been changed in different points since the original deed was recorded. Yet this deed was only made to convey one lot in this city. Here is material enough for a dozen lawsuits; and this is only one instance of hundreds in our county.—*Russell Independent.*

Quite an interesting incident occurred yesterday in one of the rooms of the west-side school-house. Miss Melville, one of the teachers, attempted to punish a boy about fourteen years of age, when the young offender drew a revolver to defend himself with. The plucky teacher relieved the boy of his weapon on very short notice, and gave him a threshing he won't forget very soon. —*Winfield Monitor.*

The *Commonwealth* says a son and nephew of Captain C. H. Scott (two boys each aged about ten years,) started on foot last Saturday for Leadville, hauling their provision on a hand sled. They went seven miles, when they halted for the night, at the elegant farm-house of C. E. Murphy, at Seven Springs, where they were overtaken by the Sheriff and Captain Scott. The boys had been reading Tom Sawyer.

Teachers of Franklin county have quite a library in the office of the county superintendent, it being the accumulation of a few of those who are interested in their own growth, and the honor of their profession. Membership in the association, and the privilege of using the library, are secured by payment of $1 and annual dues thereafter of 50 cents. Every teacher should become a member.—*Ottawa News.*

THE INDUSTRIALIST.

SATURDAY, FEBRUARY 12, 1881.

President Fairchild went to Topeka on College business on Tuesday, returning Thursday.

Reduced rates have been obtained on the A., T. & S. F. R. R., for all those attending the institutes of next week.

Mr. Pilkenton, of WaKeeney, looked through the different departments of the College last week. He expects to send his son next term.

From Hon. T. C. Henry we learn that a farmers' institute will be held at Abilene, Feb. 25th and 26th. Several of the Faculty will be present, and give addresses.

A crash of falling stove-pipes, a dense whirl of smoke, soot, and ashes, and precipitate scampering of students from Prof. Walters' room, was one of the incidents which broke the monotony of last week.

Jos. Harris,— he of "Walks and Talks," — Rochester, N. Y., sends us his Catalogue of Field, Flower and Garden Seeds. Mr. Harris is as reliable in his dealings in seeds as he is in his agricultural writings, which is saying a good deal.

Mr. J. C. Stone, Jr., Leavenworth, Kansas, sends us his catalogue of young Short-horn bulls for sale. These youngsters are of the very highest breeding, and ought to be a choice lot. Princesses, Peris and Craggs are among the attractions.

We hasten to correct an unintentional omission in our last number. The 1st division Seniors gave public orations in Chapel on Friday of last week, which were very creditable to the class. The speakers were Miss Donaldson and Messrs. Jeffery, Leach, and Myers.

The announcement, made in Chapel on Thursday morning, that the College bill had passed in the committee of the whole of the House of Representatives, was greeted with a hearty round of applause from the young men. The young ladies managed to restrain their feelings.

We acknowledge the receipt of the "descriptive circular and price list of the Kimble pump," the invention of Mr. Sam Kimble, of Manhattan. We have not given Mr. Kimble's invention more than a cursory examination; but, from what we have seen, judge it to be a useful article.

The Salina *Journal* has just passed its eleventh birthday. During this long time this excellent journal has been, we believe, under the editorial management of Mr. D. W. Sampson, the present proprietor. The *Journal* is worthy of the liberal patronage it secures from the people of Salina and vicinity.

The Managing Editor is in receipt of the following communication, which is one of those automatic, self-luminous documents which does its own talking:—

OFFICE OF SECRETARY OF THE GOLDEN BELT EDITORIAL ASSOCIATION.

You are hereby notified to lay down your scissors, cover up your paste-pot, and meet with the brethren of our "glorious profession," at Topeka, Friday, Feb. 18th, 1881; and hereof fail not, by order of V. P. WILSON, *President*.

J. H. DOWNING, *Secretary*.

We shall certainly be with you in the spirit, and, we hope, "in the flesh."

The February meeting of the Scientific Club was held on the evening of Friday, the 4th. The following papers were read: "Electrical Fish," by M. A. Reeve; "Geological Notes on Woodson County," by W. Knaus; "Building Stone," by W. Ulrich. All these papers were well received, and considerable discussion followed each. We are pleased to note that all subjects are treated from a practical standpoint. The following officers were elected for the remainder of the year: President, Prof. Popenoe; Vice-President, W. Ulrich; Secretary, S. C. Mason; Corresponding Secretary, G. H. Failyer; Treasurer, D. S. Leach; Librarian, J. C. Allen.

SOCIETY HALL, February 11th, 1881.

In spite of the rough weather, a large number of Alpha Betas were called to order by President Jeffery. After the usual opening exercises, Miss Kennet and Mr. Stricker were initiated. The question, "*Resolved*, That young ladies have better advantages than young men," was then discussed in a somewhat jocular manner. Decided in favor of the negative. Miss Fairchild favored us with a violin solo. We then listened to an unusually good edition of the *Gleaner*, prepared by Mr. Lightfoot and Miss Cranford. The President appointed committees for one month as follows: Question, Miss Haines; Reporter, Chas. Barrett. Two quartettes were appointed to furnish music alternately. As the moot-court is to be held next week, debaters were appointed for duty in two weeks, as follows: affirmative, H. A. Platt and May McConnell; negative, J. T. Willard and Gracia Pope. Question: "*Resolved*, That war is wrong under all circumstances." The *Gleaner* will be presented in two weeks by Mr. Barrett and Miss Short.

CO-SINE.

The mean temperature of January was 19°.18. This is 6°.87 below the mean for the month. The lowest temperature, -18°, was on the 9th; highest temperature, 49°, on the 29th. The temperature -18° is the lowest registered here. Seventeen below is the lowest previous temperature. This occurred on Jan. 7th, 1875. Highest barometer, 29.19 inches; lowest, 28.10; mean, 28.70. There was light snow and sleet on several days. Greatest depth of snow, two inches, fell on the 18th. Total rain and melted snow, .50 inches. This is .19 inches below the average precipitation in January. On fourteen days, the per cent of cloudiness was 80 or more. The wind was in the north at 25 observations; southwest, 23; northwest, 15; northeast, 11; south, 7; west, 5; east, 4; southeast, 3.

PARLIAMENTARIANISM.

Notwithstanding the unfavorable condition of *terra firma*, and a combination of unavoidable circumstances which, apparently, had formed a conspiracy with the elements in a futile effort to defeat the legitimate purposes of the Drill Club, a respectable number of true and tried stalwarts, who possess a sufficient strength of will and courage of heart to triumph over "the powers that be," assembled in Society Hall on Tuesday evening.

The members appear to be particularly interested in the special development of that portion of their phrenological anatomy known as the bump of —— what is its name? This being review and examination week, and, in consequence thereof, the pressure of studies seemingly exceeding the atmospheric weight of fifteen pounds to the square inch, many of the members had a just and reasonable excuse for their non-appearance at roll-call. The melodious notes of the gavel signalized the arrival of President Hopper, when matters immediately assumed an earnestness and seriousness of character that would have done credit to a more majestic assembly.

Messrs. Copley and Platt, committee on jurisprudence, made a highly interesting and instructive report, which proved a profitable disquisition to the forty members present. A report was submitted by the committee on programme that was acceptable, notwithstanding this committee was minus its appointed chairman, who, by the way, is willing to make affidavit that "Pinafore" was not the prime cause of his absence; but it is safe to presume that his substitute succumbed to the allurements of that popular drama. The election of a secretary proved "a bone of contention," and, after the defeat of several candidates, was accomplished in the selection of Miss Fairchild. This event caused the lineaments of Miss Cranford to glow with gratitude, on being relieved from the arduous duties of the position. The applause that greeted the newly elected secretary proved that the Club had made a judicious choice; and it was also a confirmation of the assertion of good old Solomon, that quintessence of wisdom, "In the multitude of counselors, there is much safety." Several ladies and gentlemen enrolled as members. If you have a curiosity to gratify, or would have your flagging energies stimulated, visit the Drill Club.

HORATIUS.

THE BREEDERS' INSTITUTE.

Below we give the programme of the Breeders' Institute, to be held in Manhattan on February 15th and 16th. It now seems certain that every paper and address named will be given, and in the exact order named:—

FEBRUARY 15TH, 2 P. M.

The Relations of Sire and Dam—PROF. E. M. SHELTON, State Agricultural College. Discussion opened by Dr. Wm. Vail, Wm. Hallowell.

The Milking Race of Jersey Island—DR. WM. T. VAIL. Discussion opened by Dr. O. F. Searl, J. Q. A. Shelden.

7:30 P. M.

The Races of Cattle Suited to the Topography of the Diverse Farms of Kansas—DR. CHAS. REYNOLDS, Fort Riley, Kansas. Discussion opened by Major F. D. Coburn, Prof. E. M. Shelton.

The Rearing of Calves—WM. WATSON, Beecher, Ills. Discussion opened by O. W. Bill, J. J. Mails.

Short-horn Families and Pedigrees—WM. HALLOWELL, Durham Park, Kans. Discussion opened by Gen. J. C. Stone, C. E. Allen.

FEBRUARY 16TH.

The forenoon will be devoted to visiting the Agricultural College and herds of the vicinity, along a specified route. Conveyances will be furnished, as far as possible.

2 P. M.

Kill Your Curs—MAJ. F. D. COBURN, Topeka, Kansas. Discussion opened by Prof. M. L. Ward, J. S. Codding.

The North Devons—GEN. L. F. ROSS, Avon, Illinois. Discussion opened by Dr. Reynolds, Maj. Coburn.

Some Obscure Points in Breeding—D. S. LEACH, State Agricultural College. Discussion opened by Maj. D. W. Crane, Dr. W. T. Vail.

7:30 P. M.

Considerations on the Management of Fairs—GEN. J. C. STONE, Leavenworth, Kansas. Discussion opened by A. W. Rollins, C. E. Allen.

The Draught Horse—DR. EZRA STETSON, Neponset, Illinois. Discussion opened by John Drew, S. A. Sawyer.

The Sheep for Kansas—J. S. CODDING, Louisville, Kansas. Discussion opened by Mr. Jones, Dr. Chas. Reynolds.

FARMERS' INSTITUTE.

The annual Farmers' Institute, to be held Feb. 17th and 18th, 1881, immediately follows the Stock-breeders' Institute noticed above. The programme is as follows:—

THURSDAY, FEB. 17TH, 10 A. M.

Wheat—Mr. WM. F. ALLEN.

Stock-feeding—Messrs. H. H. HOPKINS, O. W. BILL and H. KEARNS.

2 P. M.

Fruit Culture—Messrs. G. C. HOWARD and T. C. WELLS.

The Horse for General Farm Purposes—Messrs. JNO. WARNER and R. H. KIMBALL.

7 P. M.

"*The Kansas King*"—Rev. CHAS. REYNOLDS.

Co-operation among Farmers—Prof. M. L. WARD.

FRIDAY, FEB. 18TH, 10 A. M.

Profits of Timber Belts—Rev. E. GALE.

Fish Culture in Connection with Agriculture—HON. D. B. LONG, Fish Commissioner.

2 P. M.

Election of officers.

Reports of committees.

Possibilities in Kansas Farming—Mr. WASHINGTON MARLATT.

7 P. M.

Food Values by Chemical Tests—Prof. G. H. FAILYER.

The Farmer's Home—Pres't G. T. FAIRCHILD.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us. Its meetings are held on the first Friday evening of each month.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

KANSAS STATE
AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic, English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductiye. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the deve opment of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain.—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids. gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

Historical Society

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, FEBRUARY 19, 1881. No. 27.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,— may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Report of Chemical Department.

1878-9.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—I have the honor to submit for your consideration the following report of the Department of Chemistry and Physics, for the year ending June 30, 1879.

The following classes have been taught:—

1. A class in inorganic chemistry, numbering twenty-five. Norton's Elements of Chemistry, issued April, 1878, was introduced as a text-book. It is a vast improvement on older works, in conciseness and topical arrangement. It abounds in experiments illustrative of principles taught. Our lecture room furnishes ample facilities for performing experiments in full view of the class. In addition, each student, so far as practicable, performs the experiments for himself, in the analytical laboratory. It is gratifying to note the marked improvement in manipulation, both in speed and neatness, acquired by this practice in the laboratory.

2. A course in organic chemistry, to a class of twenty-two. It is necessary, in this branch, to depend on lectures. By making use of Edison's electric pen, a full but concise abstract of each lecture was furnished the student, thus relieving him of the very onerous mechanical drudgery of copying lectures.

3. A class numbering fourteen in chemical analysis. The work in analysis may be outlined thus: Three series of substances were put up. The first series consisted of twenty bottles of simple salts in solution. The second series is a mixture of substances previously dissolved. The third series consists of solid substances. The pupil is entirely ignorant of the composition of the substance under examination, and works independently, receiving assistance only when unable to proceed in his work. When available, rock material, ores, minerals, mineral waters, etc., have been given to the pupils for analysis.

4. A course of lectures on the composition of such food materials as had not been considered in organic chemistry and the chemistry of cooking, to a class of six young ladies.

5. A class of sixty-eight in physics. It was found necessary to form two sections of the class. By this means, a greater number of pupils were enabled to perform the experimental and demonstrative work with their own hands.

6. A class of thirteen in geology. It was the aim, in the brief time allotted this subject, to give special attention to those topics which are of more practical value. Hence, the formation of rocks and soils, and the causes operating through geological time to produce these results, were fully considered. Also a brief view of historical geology was given the class.

7. A course of theoretical and determinative mineralogy, to a class of twelve. A portion of each recitation hour was devoted to work with plow-pipe and reagents. The determination of minerals is very fascinating, and students enter upon the work with great zeal.

8. A course in agricultural chemistry, to a class numbering nine. In this course was discussed the chemistry of the soil and of plant growth, including the texture of soils and its relation to heat and moisture, as well as to the chemical reaction within the soil.

9. A class of nine in meteorology. In this course, attention was given to methods of taking observations, description and construction of instruments used, construction of weather maps, the law of storms, and the meteorology of our country. Tri-daily observations are made upon the face of the sky, direction of wind, temperature, height of barometer, hydrometric state of the atmosphere, and other casual phenomena. A record of these observations is preserved in the department, and a report forwarded monthly to the chief signal officer at Washington, and a report furnished Alfred Gray, of Topeka. Items of interest have been published in the INDUSTRIALIST.

Besides the regular class-work, a number of specimens of minerals, ores, water, &c., have been received for analysis.

Upon methods of instruction, I have to say that it has been the aim, while not neglecting facts as ground-work, to work upon the comprehension. Isolated facts are of little value unless the possessor of these facts can compare, and study relations. In the one case he cultivates the memory, the lowest of intellectual faculties; in the other he develops the reason, the highest attribute of mind. To attain this latter result has been a leading feature of my work.

Respectfully submitted.
G. H. FAILYER,
Professor of Chemistry.
Manhattan, Kansas, June 30, 1879.

1879-80.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—I respectfully submit the following report of the work and instruction in my department, for the year ending June 30, 1880.

The plan of instruction is essentially the same as that pursued during the previous year, and is given more in detail in my report for last year. The principles taught in the class-room have been fully illustrated and demonstrated by experiments; and it has been the constant aim to have the student repeat as much of the experimental work as possible. This acquaints students with apparatus and methods, and more fully impresses the truths taught. In organic chemistry, one recitation each week has been devoted exclusively to this experimental work. It is my wish to so arrange the class-work during the coming year, that on the day given to experimental work, the recitation may be two hours long. By this means, the work may be much more thorough.

The class in chemical analysis was given two hours each day, instead of one as heretofore. The results were so satisfactory that the same course will be pursued in the future.

Below appears, in a tabular form, the list of classes taught, and the number of persons comprised in each:—

STUDIES.	Males.....	Females ...	Totals by classes...	Totals by terms.....
FALL TERM.				
Inorganic Chemistry (14 weeks)	23	10	33	
Geology (8 weeks)	4	5	9	
Mineralogy (6 weeks)	5	5	10	
				52
WINTER TERM.				
Physics	39	13	52	
Organic Chemistry	19	9	28	
Agricultural Chemistry	4	.....	4	
				84
SPRING TERM.				
Physics	22	12	34	
Chemical Analysis	13	.....	13	
Household Chemistry	.....	5	5	
Meteorology	3	5	8	
				60

Good work was done by all these classes.

A large number of minerals have been received for identification. Many of them were supposed, by the senders, to be valuable ores. In all cases, answers have been returned to the parties sending them. While this work makes but little showing, seemingly, it is of great importance to the people of the State. Quantitave examinations of brines and of a few other mineral substances, have been made. But the department is deficient in apparatus for making agricultural analyses. I desire to engage in such work extensively during the coming year. To do so, I shall need platinum crucibles, dishes, &c., and additional glassware and chemicals. It will be impossible for me to do the work which will be demanded of the department without this addition to our stock of apparatus.

There is another matter to which I wish to call your attention. Alcohol lamps are very unsatisfactory for blow-pipe work. Our present course will increase this branch of chemical work. Furthermore, it is with extreme difficulty that some of the most important determinations in grain and soil analyses, can be made, with our present sources of heat,—alcohol and charcoal. I desire, as soon as you can afford the means, to procure a pneumatic gas machine, for supplying us with vapor of gasoline. This gives a heat *almost* equal to gas, and will cost less. I hope this matter may receive your favorable consideration. We need a small store-room in the basement for storing chemicals in the winter. Some minor repairs are needed about the present museum and apparatus cases; and provision should soon be made for enlarging these cases, to meet the growing wants of this department.

Respectfully submitted.
G. H. FAILYER,
Professor of Chemistry.
Manhattan, Kansas, June 30, 1880.

Our Exchanges.

Since the time has expired for shooting quail, the market is glutted with spring chickens of suspiciously small proportions. —*Emporia News.*

January has come and gone, and not a furrow has been turned;—the first time a month has passed within the memory of man without some plowing being done.—*Wellington Press.*

There were forty-eight cars of produce—cattle, hogs and grain—shipped from Clay Center last week. How is that for a way station on a branch road that don't pay expenses?—*Dispatch.*

The Supreme Court last week declared the medical bill, which required every person who wished to practice medicine to procure a certificate from a medical board and pay $5, unconstitutional.—*Exchange.*

The farmers are predicting good crops in everything except grasshoppers; and great fears are entertained that this will be nowhere up to the average. They think the fall plowing should have been deeper.—*Wichita Republican.*

About 1,000 cords of wood are being piled up at the depot, for shipment by the railway company. This will sound strange to settlers in the western counties, when they learn that Kansas is exporting fire-wood.—*Wabaunsee County News.*

Caldwell is torn from center to dome, by a foolish act of their school superintendent, who is charged with punishing a white child by compelling her to sit by one of color, and shaking hands with a strange little human called a "nigger." A court trial will be the result of the "offence;" and, as a consequence, there is no school this week, and the little boys are on the streets learning more devilment and corruption than will be ruled out of them in a six months' schooling of the strictest sect.—*Wichita Republican.*

THE INDUSTRIALIST.

SATURDAY, FEBRUARY 19, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

The Devons.

As an outsider, we were very much interested in the animated discussion on the relative merits of the different breeds of cattle, at the late meeting of the Central Kansas Breeders' Association. The prevailing opinion was, that the Short-horn is the animal for the Kansas farmer who makes beef-raising his business.

Dr. Vail championed the little Jersey. He stated that she had been bred for 200 years to develop her butter-producing qualities, and that she was *par excellence* the butter cow. He tried to convince the Association that the breeding of Jerseys would be profitable in this State, showing from published statements that at the sales of pure-bred cattle during the past year, the average price paid for the Jerseys was greater than that paid for Short-horns. These sales were generally in the eastern States. Mr. Harris explained this by saying that the Jersey was the rich man's cow; that her beauty, her gentleness, and the superior quality of her milk and cream for family use, created a demand for her among the wealthy; and that these high prices were no criterion of her general utility. A Jersey cow is a luxury.

On Wednesday afternoon, Gen. L. F. Ross, of Avon, Illinois, gave a very interesting paper on the Devons. While admitting the superiority of the Short-horn as an early maturing beef animal, the General claimed that for many parts of the country, and for a rough system of farming, the Devon is superior to any other one of the distinctive breeds. The General stated that he had formerly been a breeder of Short-horns, but had deliberately come to the conclusion that for his system of farming, which he designated "rough," the Devon is the breed for him. After giving the history of the breed and brief accounts of the prominent herds and individual animals which he had seen, he closed his paper as follows: —

"The Devon cattle are recommended to the favorable consideration of the farmers of Kansas, for the following reasons: —

"*First.* For the superior quality of their beef, milk, and butter.

"*Second.* For the cheapness with which they can be kept on the farm; their hardy, rugged nature enabling them to live and thrive on the coarsest and most innutritious food.

"*Third.* Their strong, vigorous, and iron constitution enables them to resist disease and endure climatic changes.

"*Fourth.* Their great muscular development, their strength and activity, make them the best of work cattle, and enable them to gather their own food, and work their way through life.

"*Fifth.* Their beautiful and symmetrical forms, their graceful style and carriage, and their rich, glossy, red coats, ever please the eye, and ever fill the heart with admiration."

The General presented the good qualities of his favorite breed in a forcible and attractive manner; and to us, an outsider, his statements seem worthy of careful consideration. For the small farmer, who depends quite as much upon butter as upon beef to raise money, why is not the Devon better than the Short-horn?

Gen. Ross for several years has been experimenting with a view of producing a new breed of cattle. His object is to originate a breed with all the good qualities of the Devon, without the horns. Thus far, the results are encouraging. If he succeeds, his name will be enrolled with those of Bates, Booth, and other great benefactors of their race.—*Prof. Ward.*

A Suggestion in Reference to Flower Planting.

Not the least profitable expenditure of time and money is that given to the cultivation of flowers. There is so great variety, with flowers adapted to all places and occasions, that the person who owns or occupies a plot of ground, be it small or large, has no good excuse for not adding, by means of flowers, to his own satisfaction and pleasure, and, at the same time, to that of the public.

The flowers most popular where display of color is wanted, are mostly greenhouse plants, or annuals, or plants that may be treated as annuals. Verbenas, phloxes, portulacas, salvias, geraniums, and others of similar habits, are the favorites in this class of plants. The effect of these flowers is heightened, if they are so arranged as to harmonize or contrast agreeably in colors: this end is attained by planting the proper sorts in masses, or in ribbons and other well defined designs. The value of these flowers for such purpose is above that of any others. There is a demand for such planting; and the demand is the outgrowth of correct taste. This style has proven so attractive to the majority of flower planters as to cause the beauties of other plants to be lost sight of; and it is the object of this article to say a word in behalf of the many interesting and beautiful hardy perennial herbs. These form a class of flowers that will not call for a great outlay of valuable time. Once they are given the opportunity to become established, they will, with little care, continue to furnish their blossoms for many years. An occasional division of the clumps and removal to fresh soil, a little attention to keeping down the weeds and stirring the soil in summer, and, in some cases, to covering the plants in autumn, are all the favors asked by plants of this character. By a little preliminary study, the planting may be so arranged that there will be something interesting and attractive in bloom at all times during the flower season. Greater variety can be maintained in a given space, and with less trouble and expense, by the use of these plants than by planting those of any other single class. To one who sees the flowers from the standpoint of the lover of botany, the perennials are, from their variety, especially attractive. The lists of those proven by trial to be adapted to the climate of this State, are not as extensive as might be wished. A few old standards that were found in the gardens of our grandmothers, and others of more recent introduction, really valuable, but as yet not fully appreciated, make up the number. The choice varieties of columbines, larkspurs, pinks, irises, pæonies, pentstemons, and phloxes, are worth the attention of any one; and go far, with a tithe of the care, to replace the more showy beds of annuals. It should be a part of the plan of each flower lover, to make trial of the merits of one or more of the most promising novelties, each season. The outlay need be but slight, and the knowledge so gained has value outside the garden of the experimenter.

Many of the best perennials may be grown from seed, which, if planted quite early in hotbeds, or boxes in a warm room, will sometimes produce plants to flower the first season. Some kinds, however, are more cheaply obtained, already started, from the florist. The catalogues of all large florists' establishments now include a good assortment of plants of this character. The nurseries of Messrs. Woolson & Co., Passaic, N. J., are entirely devoted to the propagation of hardy perennials; and three or four hundred kinds are included in their list. Any one would find it worth while to send for their catalogue, if only to get an idea of the wealth of material available for this kind of planting.—*Prof. Popenoe.*

The Breeders' Institute.

Despite the intense cold, the deep snow, the snow-bound trains, and the general disagreeable aspect of nature, a fair audience, including a number of gentlemen from abroad, assembled in Peak's Hall, on Tuesday afternoon, at the opening of the Institute.

President Bill called the meeting to order; and, after appropriate remarks in which he referred to the general work of the Association and the special object of the Institute, announced the opening address by Prof. Shelton, on "The Relation of Sire and Dam."

A desire to improve domesticated animals is indicative of progress in agriculture. Those living to-day are reaping the fruits of the labors of Bakewell, the Collings, and Booths, of previous generations, who devoted their lives to the development of different characteristics of animals. Stock-breeding is now not restricted to a few. Every progressive farmer is asking the question, How can I secure the best breed of cattle for my farm? In answering this question, one must first have a definite idea of what he wants. Stock-breeding is not a science but an art. The intelligent breeder constantly refers to the principles of science, and these do, indeed, explain many of the practices of the breeder; but the value of any principle of breeding can only be understood through the test of experience. The importance of the subject of live-stock improvement has been known and confessed from the earliest times; and nowhere has this question been more fully appreciated than in our own State. This may be accounted one of the "A, B, C" questions of our agriculture, which, certainly in this community, and before an association of stock-breeders, need not be dwelt upon.

In this great work of improvement, which the speaker aimed to discuss chiefly from the standpoint of beef production, the chief questions of interest are, (1) which breed will best accomplish the object sought? and (2) how shall we obtain the best results from a given breed? The merits of the different breeds would doubtless be shown by several papers, which were to follow in the programme: the speaker only aimed to answer in part the second of these questions.

Naturally, the sire is the great engine of improvement; for, practically, he is one-half of the herd. We may be comparatively careless in the selection of individual females of the herd; but, in the selection of the sire, we cannot afford to make mistakes. In the first place, our selection of the sire should be based upon useful qualities only. Matters having no intrinsic value, and representing no valuable quality, like the shape of the horn or color in Short-horns, ought not to influence our choice. The sire likely to do the most valuable service was rapidly sketched. He would be a medium, perhaps undersized, animal; short in the leg, compact, and close to the ground; and, when viewed from the front or rear, his outline would have the form of a square, and at the side a parallelogram.

The common error of selecting the male on account of his great size, could not be too strongly condemned. The most useful and prepotent sires that the world had yet seen were moderate-sized animals. In proof of the correctness of this view, numerous instances were given from the prize herds of Bates, Booth, and other noted breeders of the Short-horns, and breeders of Essex and Berkshire swine.

Pedigree must not be regarded as a mere "fancy point." Even the breeder of grades could not afford to lose sight of the importance of an authentic pedigree for the sire.

Violent crosses were to be avoided, and no one need to expect that rapid improvement could be made. It took centuries to create and fix a breed; and the lifetime of an individual was hardly long enough to give a particular character to a single family of Short-horns.

The question was ably discussed by Dr. Vail, Gen. Ross, and others.

On Tuesday evening, a paper was presented by Dr. Wm. T. Vail, on "The Milking Race of Jersey Island." Starting with the proposition that every one of the distinctive breeds known to-day, have been bred for a single purpose, he briefly noticed the peculiar advantage of each. For one hundred years the Short-horn has been bred to develop beef: the Jersey has been bred for butter nearly twice as long. It had been proposed to exclude the little Jersey, as a competitor, from the Riley county fair. The Doctor showed, from files of the *American Agriculturist* and *Stock Journal*, that the Jersey was increasing in popularity. She would always rank first for butter. The Doctor's points were all well sustained; but they made no impression on the Short-horn breeders, who composed the greater part of his hearers. The discussion which followed was mainly upon the points presented in the address of the afternoon.

The afternoon session on Wednesday was opened by an exceedingly interesting address by Gen. Ross, of Illinois, on "The North Devons." This address is noticed in another column.

A well-prepared paper was presented by D. S. Leach, a member of Prof. Shelton's class, on "Some Obscure Points in Breeding."

On Wednesday evening, Gen. J. C. Stone, of Leavenworth, read a valuable paper on "The Management of Fairs." At the urgent request of the Association, the General consented to the publication of his paper. President Fairchild said that he had entertained for years the views just expressed. Others expressed their concurrence; and the desire was expressed that every farmer should have an opportunity to read the paper. It should be printed as a tract for general distribution. Thirty years ago agricultural fairs were a success without the horse-races and the inevitable gambling connected with them.

The last paper presented was on "The relation of Dogs to Sheep." Maj. F. D. Coburn (the author of the paper), from the office of the Secretary of the State Board of Agriculture, gave the relative status of the dog and sheep industries of the State. In the Major's opinion, the dog interest predominates. He estimates, from carefully collected data, that the Kansas dogs number about 289,000, while the sheep in the State would scarcely furnish a single meal for the hungry curs. In some counties, a single sheep would have to be divided among four dogs. Riley county could furnish a fraction over two sheep for each of her dogs. He attributed this generous provision to the elevating influence of the Agricultural College. The Major is a good hater of the canine race.

But, seriously, the paper was a valuable one, containing many excellent practical suggestions, and proving, from the testimony of sheep-growers in every county of the State, that dogs and wolves are great drawbacks to sheep husbandry in Kansas. We hope to see the Major's paper in the *Kansas Farmer*.

Several of the papers read will be published in full. The discussions were fully participated in by all present. The younger members of the Institute are under special obligations to Gen Ross, of Illinois, and Col. Stone, of Leavenworth, who were able from personal experience to answer many questions asked. The attendance would have been much larger had the roads not been impassable. Those intending to come from adjoining counties, in their own conveyance, could not possibly reach the meeting.

REPORTER.

THE INDUSTRIALIST.

SATURDAY, FEBRUARY 19, 1881.

The *Capital* heads a recent article, "The Pleasures of Freezing." How intensely happy we must all have been this winter!

We need offer no apology for the large amount of our space devoted this week to the proceedings of the Institute. The report will be found interesting and instructive.

The programme of the Farmers' Institute heretofore announced, was carried out essentially as published; and the meetings were well attended. A report of proceedings will appear next week.

We received yesterday a file of Japanese papers of a late date. Strange to say, these contain no reference to the "ground hog" or the "amendment;" which ought to make their readers profoundly grateful.

Happy the child who first sees the light of day during this winter. In the long years to come, it will be his privilege to tell to wide-eyed grandchildren that he was born during the terrible winter of 1880-81.

At the Breeders' Institute, a resolution was passed unanimously endorsing the Keifer bill for the prevention and extermination of pleuro-pneumonia, now before Congress, and urging our Senators and Representatives to use every effort to secure its passage.

The whole of Tuesday of next week, the anniversary of the birth of the youth who made such excellent use of his little hatchet, has been set aside by the Faculty as a holiday, to be wound up by a grand walk-around, blind man's buff, "Simon says thumbs up," and, in brief, all the usual attractions of the "social."

A number of gentlemen in attendance upon the meeting of the Breeders' Institute, spent a portion of the forenoon of Wednesday in visiting the College. Among the number were Gen. J. C. Stone, of Leavenworth, Gen. Ross, of Ills., Messrs. Harris and Swain, of Lawrence, Major F. D. Coburn, of Topeka, Mr. Maxwell, of Salina, and Mr. Morse, of Wamego.

The Secretary of the late Breeders' Institute wishes to offer his acknowledgments to Dr. Chas. Reynolds, Ft. Riley, Kas., Mr. Jos. H. Payne, of Kansas City, Mo., and Mr. J. S. Codding, Louisville, Kas., for excellent papers prepared for the Institute, but which, chiefly on account of overdue trains, were received too late for presentation to that body.

Although the roads have been well-nigh impassable, and the weather as bad as bad can be, yet very few of our students have excused themselves, on these accounts, from chapel and general College exercises, although these duties begin at the early hour of half-past eight in the morning. This fact speaks strongly for the enthusiasm and industry of our students.

Despite the storm, the Breeders' Institute was a grand success. The papers read were of high order; and, had the weather been favorable, there would have been the largest assembly of practical breeders and stock-raisers ever seen in Kansas. As it was, gentlemen fought their way through the storm from Leavenworth, Lawrence, Topeka, Salina, and other remote points.

We have received a handsome photographic representation of the champion herd of prize polled Angus heifers, at the Highland Societies' Show, held at Perth, in 1879. These bovine wonders, the oldest of which had seen but eighteen months, averaged 1,570 pounds live weight. Be sure, friends, that these Angus doddies will make trouble for some of the breeds that now so confidently occupy the field, when their merits are more fully known.

It is a little amusing, and we confess not altogether unpleasant, to witness the "spelling-reform" editor as he lapses occasionally or permanently into good English. Thus, we find one of our exchanges, after a several weeks' tussle with "telegraf," comes out manfully with telegra*ph* again. But we remain in doubt, whether to credit this to a new compositor, or proof-reader, or a "change of heart" on the part of the editor.

SOCIETY HALL, January 13th, 1881.

Society called to order by President Myers. After roll-call and devotion, debate was conducted with more than usual interest, and was decided in favor of affirmative. Order of extemporaneous speaking was passed for want of sufficient time. Under the head of new business, a motion was made and carried, that the corresponding secretary be instructed to communicate with H. C. Rushmore, of Grantville, in regard to purchasing the remaining ten volumes of "Chambers' Encyclopedia of Universal Knowledge." Committee on programme reported as follows: Question for next session, "*Resolved*, That the discovery of gunpowder has been beneficial to mankind." Affirmative, Messrs. Brady and Paine; negative, Messrs. Andrews and Corey. *Reporter* to be presented by F. M. Hutto. L. H. Neiswender, Edwin Fairchild, M. A. Corey, and E. C. Paine, are committee on programme. Next followed report of critic and reading of the minutes, after which the Society adjourned.

CALL.

Mr. Wm. Watson, well known in Kansas as the former superintendent of the Durham Park herd of Short-horns, and now superintendent of Mr. T. L. Miller's celebrated herd of Hereford cattle, writes us of his intention to visit his native Scotland early the coming summer, for the purpose of importing, on commission, Angus cattle. Mr. Watson is the best judge of Angus cattle and their pedigrees, living; and we counsel all those interested in this famous race of polled cattle, to write him at Beecher, Illinois.

A telegram, just received from Topeka, informs us of the final passage in the Senate of House bill 93, making appropriations for the Kansas State Agricultural College. We judge, from the wording of the telegram, that the bill has passed the Senate as it came from the House. The items of the bill are as follows:—

For the restoration of the endowment fund	$17,979 09
For repairs buildings, and furniture	800 00
For Chemical Department,—gas machine fixtures, and cabinet cases	700 00
For Horticultural Department,—cases for cabinets	250 00
For Farm Department,—fencing, ditching, special stock, and experiments	1,000 00
For General Instruction Department (Library):	
1882	1,000 00
1883	1,000 00
For the erection and furnishing of the Central College building:	
1882	15,000 00
1883	15,000 00
Total	$52,729 09

PARLIAMENTARIANISM.

Another week is merged into the shadows of the past; and another session of the Drill Club is an additional event to the era which marks the grand cycle of time. Although the "fates" seem to have concentrated their forces in a general warfare against the regular proceedings of this august assembly, nevertheless, like Banquo's ghost, it has persistently refused to "down." In vain has old Boreas, with his Manitoba waves and arctic visitations, sandwiched with tropical convulsions and re-enforced by Pinafore and other panoramic scenes of the socialistic world, rebelled against the spirit of the Club.

Last Tuesday evening, notwithstanding the numerous fortifications in the shape of snow-banks which seriously affected easy access to Society Hall, and the astonishing idiosyncrasies of mercury violently struggling to eject "freezo" through the bottom of the thermometer, an interesting number participated in analyzing the mystified principles of parliament. As it was the expiration of the term of office of president and marshal, the members, in the election of new officers, had an amusing wrangle with the question, "The committee of the whole," in which a number floundered, and only by a strenuous effort kept out of the vortex. Charles Marlatt, having been called to the chair, labored manfully to evade the parliamentary missiles which were hurled at him from right and left; but finally, concluding that discretion was the better part of valor, unceremoniously surrendere l his seat, when the persuasive tones of Charles Barrett, "like oil upon the troubled waters," pacified the impetuosity of the members and safely piloted them into the harbor.

The honors of president were conferred upon Mr. W. Knaus, who, on accepting the position, delivered an entertaining inaugural in his clear, forcible, convincing and Websterian style. Geo. E. Hopper, in his valedictory, expressed a hearty willingness to vacate the chair for his successor, which, during his presidential reign, he discovered was not as "soft as downy feathers." The duties of marshal were assumed by the ex-president. Several of the lady members were present and took quite an active part in the exercises.

HORATIUS.

WINTER AND SPRING TERMS.

A winter term of twelve weeks begins on the afternoon of Monday, Jan. 3d, at which time applicants for admission will be examined. All should be prepared for examination in Arithmetic to percentage at least, and in elements of English, as well as in Reading, Spelling, Writing, and Geography. The regular first-year class will enter upon Book-keeping and U. S. History, continuing their study of the English language, by analysis of words and thoughts, and by exercises in expression.

Other classes will pursue the courses presented in the following arrangement of class hours:—

First Hour.—Geology, Horticulture, English Structure, and English Drill.

Second Hour.—Trigonometry, Chemistry, and Book-keeping.

Third Hour.—Logic, Geometry, and United States History.

Fourth Hour.—Zoology, Chemistry, Practical Agriculture, English Structure, and Arithmetic.

Fifth Hour.—Household Economy and Chemistry alternating, and Arithmetic.

Drawing and industrial classes will be so arranged as to accommodate the students.

Immediately after the close of the winter term, a spring term of ten weeks begins, during which the regular classes continue their course as follows:—

First Year.—Algebra. English Composition. Botany, with Drawing.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—Geology. Political Economy. Agricultural Chemistry.

Provision will be made for continuing classes less advanced than the regular first year; but all students entering at the beginning of the spring term, should be well advanced already in all the common-school branches. No beginning class will be organized.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us. Its meetings are held on the first Friday evening of each month.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECONDYEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids. gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpentershop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

E. D. Adams

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, FEBRUARY 26, 1881. No. 28.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Report of the Horticultural Department.

1878-9.

To the Regents of the Kansas State Agricultural College:—

GENTLEMEN:—The following is the report of the Department of Botany and Horticulture, for the College year beginning September 3, 1878, and ending May 21, 1879.

On the 3d of September, 1878, I took charge of the department. In accordance with the instructions of the Board of Regents, and especially those of President John A. Anderson, it has been my endeavor during my time of service to give to the students under my care such instructions as would be of benefit to them in practical life.

BOTANY.

In accordance with the course laid out in the curriculum, I taught the class in botany during the first three months of the term, beginning September 3, 1878. There were thirty-five in the class, which was formed into two divisions, for convenience in recitation. Owing to the fact that the season of the year afforded very poor opportunity for gathering specimens in a proper state for analysis, I could not make the instructions as experimental as I desired. However, everything that could be found to be used in illustrating the science was carefully sought. Occasional excursions were taken with the class, collecting and examining specimens. "Gray's Botany" was used as a text-book.

ENTOMOLOGY.

The last month of the first term was devoted to the study of entomology. There were thirty-three members in the class. Owing to the very short time allotted to this study, it was necessary to use a brief and condensed text-book. "Lessons in Entomoeogy," by W. Wheeler, was selected as being the best for the time. It being winter, very few live specimens could be found; and the mounted specimens in the cabinet were used to illustrate, so far as they could be.

PRACTICAL HORTICULTURE.

At the beginning of the second term, January 3d, 1879, the class in practical horticulture was organized. Twenty-nine members were enrolled during the term. Four months were devoted to this division of the study. Instructions were given entirely by lectures and by practical work in the art, so far as was advisable. The lectures were intended to convey such information as might be needed in planting and caring for the orchard, vineyard, small-fruit garden, vegetable garden, and the rearing of nursery trees, &c. Forest culture and floriculture received a portion of our attention. Such principles and suggestions, relative to landscape gardening, as were thought to be susceptible of practical application, were also taught. In all these branches special attention was given to the selection of suitable soil and location, and such varieties as are suitable to Kansas. Each student was required to select and cut cions in the orchard, and to practice the various modes of grafting.

I was highly gratified with the deportment of the class through the entire year. Almost every one seemed anxious to learn, not only the scientific, but the practical. If during the past nine months there have been planted the seeds that will bear good fruit in the lives of the members of the class, my object will have been attained.

OUTDOOR WORK.

From the day I took charge until the expiration of my time, it has been a constant source of thought and labor to put the appurtenances of the department in good order. Thickets of overgrown nursery stock, and other waste patches of brush and weeds have been cleaned up. The vineyard has been trellised, and put in good shape. The orchards have been plowed, and seeded to orchard-grass. Owing to worthless seed, this last did not succeed. A number of new varieties of apples have been collected, and grafted into bearing trees in the orchard.

A collection of forest-tree seeds was received from S. M. Curl, M. D., of New Zealand, and another lot from Japan, through the Department of Agriculture at Washington, D. C. These seeds were carefully planted and cared for until my time of service closed. Some new varieties of fruits have been procured for the purpose of experiment. Among these is the Japanese persimmon (*Dyospyras kaki*), which is attracting so much attention. No money has been expended for these things, except in the case of apple stocks for grafting purposes, and in payment of postage in some other cases.

In connection with class instructions, I planned and executed an ordinary vegetable garden, that the students might better understand this much-needed and often-neglected matter.

ORNAMENTAL.—There being no definite plan of the grounds, but little could be done in this direction. Accompanied by some of my class, I went to the woods and procured some four hundred plants of the American ivy (*Ampelopsis virginiana*), and planted them at the base of all the College buildings except the barn. A little has been done in the way of making flower beds, and planting them with perpetual roses and other plants mostly of a permanent nature. A hedge of prim was set on two sides of the vegetable garden, which, if properly cared for, will become very pretty.

THE CABINET.

Specimens of wood have been received from Texas, and placed in the proper collection. Mr. John Morrison, of Missouri, has kindly presented a very nice collection of the ferns of that section, to be placed in the herbarium.

In addition to the duties of the department, I have taught a class of eleven in practical arithmetic during the last four months of the year, also a class of fifteen in zoology during the month of January, 1879.

Respectfully submitted.
H. E. VANDEMAN,
Professor of Horticulture.

1879-80.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—I have the honor to present the following report on the work done in the Department of Botany and Horticulture, during the period between September 10, 1879, and June 30, 1880.

BOTANY.

During the College year, I have had charge of two classes in this study. A class of third-year students, forty-three in number, was formed at the opening of the fall term. The time was unfavorable to the proper study of this science, on account of the lack of suitable material for illustration and study — a requisite, in my opinion, of greater importance than a text-book. Use was made, however, of all attainable material, with manifest advantage. The study was begun by the persistent examination of plants, without the use of books, or without direct instruction from any source, the object being to call the attention of the student to the importance and value of self-reliant observation. The time taken up in this manner was well spent. The course, as proposed by the text-book (Gray's Lessons), was slightly modified to suit the requirements of our adopted course of study: less attention was paid to physiological botany, in anticipation of a more complete study of that branch in the after part of the course. The class was occupied in the study of botany for a period of ten weeks in the fall term, and three weeks in the spring term; the latter portion being given to the study of systematic botany, with the aid of Gray's Manual. Classified collections of plants were required of this class.

The first-year class in botany (a result of the recent changes in the course of study) was formed with the opening of the spring term, and included twenty-six students. Owing to the ease with which fresh material for study was obtained, the progress made by this class was very satisfactory. The mode of instruction and the scope of the course were essentially the same as described in my reference to the third-year class, with such slight modifications as were demanded by the less-advanced standing of the students.

HORTICULTURE.

At the opening of the winter term, a class of thirty-six third-year students was formed, for the study of horticulture. Instruction was given by lectures upon the important topics relating to the propagation and care of plants grown for use or ornament. It is my aim at all times to show the close connecton existing between horticulture and botany; and, in accordance, the first topics treated in my lectures were those general truths in physiological botany upon which depends all success in propagation or cultivation. I may instance, for example, the following: The seed and the bud, compared and contrasted; variation of the seed,—how directed into profitable channels; cross-fertilization,—its importance in the amelioration of varieties; the physiology of the various modes of bud-propagation. So far as our facilities allowed, the practical operations in the nursery and orchard were taught in the only successful way,—by actual practice. In this direction, however, there is room for greater results than have yet been attained; and it is desirable to increase the facilities for this branch of instruction in horticulture. I may here advert to the great interest shown by the student in these operations when performed by himself,—a good illustration of one point of superiority in object-teaching.

ENTOMOLOGY.

As an adjunct to the course in horticulture, entomology was studied for six weeks. The first half of this time was devoted to the study of the anatomy and classification of insects in general; the remainder, to the consideration of the habits of our most prominent injurious and beneficial insects, with the best methods for the control of the former. The instruction was given entirely by lectures, illustrated by the insects themselves, by charts and drawings. Collections were required here, as in botany.

ZOOLOGY.

This study was pursued under my instruction by a class of ten seniors and third-year students, using Orton's Comparative Zoology as a text-book. The work of the class occupied the winter and spring terms. That portion of the text-book given to systematic zoology being somewhat abridged, it was thought desirable to give opportunity for more extended acquaintance with the methods of study in this branch of the science. To this end, the class studied more in detail such specimens of birds as were at command, making large use of my private collections and library.

[Concluded on fourth page.]

THE INDUSTRIALIST.

SATURDAY, FEBRUARY 26, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

The Farmers' Institute.

On account of the stormy weather, the evening sessions were omitted; and the whole programme, with a few exceptions, was crowded into the four day sessions of Thursday and Friday, Feb. 17th and 18th.

Mr. H. H. Hopkins presented the first paper, on Stock Feeding, in which he set forth very clearly his ideal. Cattle carefully selected for feeding qualities should be kept in small, equal groups, and fed and watered regularly in protecting enclosures, with the shed on the north side, open to south. Plenty of dry bedding should be furnished, and no hogs should run with them. All refuse should be removed from feeding troughs after each meal; and variety of food should be sought — the best of its kind.

"The Kansas King"— corn, of course — had its birthplace and early history thoroughly discussed in a paper sent by Dr. Reynolds, of Ft. Riley. The Doctor was not able to be present himself.

The Horse for General Farm Purposes was described by Mr. Jno. Warner as a strong-built, fast walker, from twelve to fifteen hundred pounds in weight. Such horses could work with less strain: the colts could be put to harness early, and at maturity would sell for twice as much as lighter horses. Mr. R. H. Kimball presented his ideal farm horse in an active, muscular animal of eleven hundred weight; and claimed that such a horse would do better work in plowing, cultivating and marketing, than the heavier one, though the latter might sell better in a city market.

Mr. T. C. Wells set forth very concisely and clearly the essentials of a good orchard. Choose a well-drained northern slope, if possible, with lower land or a body of water contiguous; protect it by a wind-break — of cottonwood and box-elder, perhaps — on all sides. Plant in well-broken soil, about forty feet apart, making plenty of room for the roots, and packing loose earth closely about them. Take stocky trees from the nearest reliable nursery, and keep the roots from exposure to the air in the transfer. Cultivate, after planting with a crop of corn as an economical protection and an advantage to the growing trees. All these particulars were sustained by reasons drawn from experience.

Rev. E. Gale set forth cogently the Profit of Timber Belts for a protection to orchards and crops. These can be depended upon to much reduce the loss from droughts, though not to prevent their recurrence. Such belts protect from both cold and hot winds, and retain moisture which would otherwise be quickly dissipated. Cottonwood, box-elder and the elms were recommended for the purpose.

State Fish Commissioner Long, of Ellsworth, gave an instructive account of fish culture, especially recommending the raising of the German carp in small ponds, for family use. They are as readily raised — where a pond can be kept supplied with good water — as pigs, and may be far more profitable. The Commissioner exhibited samples of various kinds of fish in several stages of growth, and described his efforts at introducing them into the ponds and streams of the State. Any one desiring to undertake carp culture should apply to U. S. Fish Commissioner Baird, at Washington, who will furnish them free of charge.

Prof. M. L. Ward gave a clear account of various efforts at co-operation as illustrated in the money-saving combinations of Germany, the building companies of France, and the co-operative stores of England. The especial advantages of such stores among farmers were shown to be great, provided careful and judicious management can be secured. The great success of such a grange store in Olathe, Johnson county, was given as an illustration.

Prof. G. H. Failyer, in "Food Values by Chemical Tests," presented some well-established facts in regard to the various common grains and vegetables eaten by man and animals. Analyses by himself and other chemists were given for comparison; and various experiments were described, showing the results of feeding starchy, oily or albuminous substances separately. The paper contained suggestions of practical application worthy of further illustration and demonstration.

On account of the lateness of the hour, Mr. Marlatt withdrew the topic assigned him that the time might be given to a condensed talk of twenty minutes upon the Farmers' Home, by Pres. G. T. Fairchild. The essential elements of such a home, in the dwelling, its surroundings, and a spirit of order and affection within, the means of its upbuilding, and its influence over the life and happiness of its inmates, were named and briefly illustrated.

Interesting discussions followed most of the papers presented, in which Messrs. J. Mails, Wilson, Huse, Hewitt, Bill, Barnes, Corbett, Maxwell, and others took part.

A resolution offered by O. W. Bill, pledging farmers to poison wolves during the month of March, 1881, was passed without dissent.

Our Growing Telegraph System.

The recent consolidation of the largest three telegraph companies in the United States, has seemingly caused considerable apprehension as to the tariff question; and the remark about the monopoly with iron heel-plates is frequently indulged in. That this consolidation will result in a monopoly of great dimensions, perhaps no one will question; but that it necessarily follows that the tariff for the transmission of messages will be raised, except perhaps at places that before the union of these companies were competing points, is not so evident.

Twenty years ago, a message sent from New York to New Orleans passed over the lines of no less than four different companies, and an answer to it was not expected within twenty-four hours from the time it was started. Now a message goes from New York to New Orleans over the lines of one company only; and, if the answer to it is not received within an hour, something is wrong. In 1870, the average price paid by the public for the transmission of its messages, as shown by the reports of one of the largest telegraph companies in the United States, was $1.40. In 1880, the average price per message was a fraction over thirty-eight cents. This shows a decrease of more than two-thirds in the average price per message in ten years. That this great difference, both in the cost and speed of transmission, is largely due to consolidation, is evident when we consider that, before any such consolidation took place, the public had to support a number of companies with all their miles of wire, their armies of employes, and, above all, their bondholders, eager for dividends, where afterwards it supported but one. The time and expense of transferring business from one company to another is saved, and the time necessary for transmission thereby lessened.

That "competition is the life of trade" is seemingly true in many instances; but it is not in the telegraph business, except at a few places. Whenever the lines of two or more companies enter a town, there arises a war of rates, which no doubt is beneficial to the people of that town; but it is not so with other towns that have not the advantage of being competing points, for the reason that each company must live, and the amount lost in the ruinous war of rates must be made up by other parts of the country over which the lines of the company extend, in the shape of higher charges for the same service rendered. A number of consolidations of this kind have occurred in the past few years; and we do not remember that they caused such a hue and cry about that peculiar grinding effect said to be produced by monopolies as has been raised about this one. At least the feeling does not seem to have been strong enough to require the attention of the United States Senate, with a view to the prohibition of the consolidation of such companies. In 1866, fifteen telegraph companies were consolidated into one, and from that time the rates have decreased regularly until the present; and there is reason to suppose that they will be gradually lessened as facilities for transmission without transfer from one company to another are increased.

The United States already boasts the most extensive, efficient, and the cheapest telegraph service in the world. A message can be sent the extreme length of our country, or from Portland, Maine, to San Francisco, California, a distance of near 3,000 miles, for $1.50; and in no other country on earth can a message be sent the same distance for a like amount. The uniform shilling rate of Germany and France covers only small areas, and if applied to long distances would be much higher than the American rates; that is, if a message be sent a distance of 3,000 miles under the German or French tariff, it costs about $4.00. The largest of the three companies which form the new organization—the Western Union — brings into the combination 85,645 miles of poles, 341,025 miles of wire,— 107,491 miles of this being phantom or unseen wire, meaning the additional capacity obtained by using the duplex and quadruplex methods of transmission,— and 9,077 offices, with 10,750 employes. These figures serve to show something of the size of one party to the compact; while the fact that during the year 1880, they handled 3,000,000 messages per month, or 100,000 for each day of the month, shows the immense amount of business done. Upon the supposition that a large amount of work can be done at proportionately lower rates than can a smaller amount where the expenses are nearly the same, does it not appear that the more extended the facilities, and consequently the larger the amount of work performed, the lower the rates will be? We think the cause of this apprehension is more directly traceable to stock speculation and its effects, than to any imminent danger of increased rates arising from the consolidation.—*Sup't Graham.*

The Farm-house.

Many a good farm lacks its essential accompaniment, a good farm-house, because the house seems rather a place for expense than money-making. Yet who can think of the dug-out or cabin as a suitable workshop for even the least delicate parts of household economy,— eating and sleeping? Of course every farmer counts a good dwelling among the essentials of improved farming, and only waits for the convenient season for getting "out of the old house into the new."

But what the new house ought to be is worthy of more study than we sometimes give. The house is a machine for producing health and comfort to the family. Every step saved by its convenience is a source of profit, as much as saving in stock-feeding. Every provision for good health, by proper warmth, ventilation, and drainage, is a good investment for the household. The outside show of paint and filigree is of little importance compared with the inside conveniences for saving labor in providing daily food, and looking after general neatness and order. The internal plan should take most thought, even if one has "to lie awake nights over it;" for two steps saved in the distance from sink to pantry make miles in a lifetime.

A few general principles may help in such planning, though their application must vary indefinitely with individual tastes and necessities. Assume at once that all the house is made to be *used* and *enjoyed*,— not all to be treated alike, but to serve a purpose in the family life,— and adjust the different rooms to each other as the family wants suggest. Begin with the living-room, which usually serves as sitting-room, dining-room, and winter kitchen perhaps. Make this the center, out of which all the rest of the house grows. This should be the room most easy of access from without and within. It should have the sunniest outlook in the morning and the breeziest in the afternoon,— a position found in this State, and through most parts of the West, at the south-east corner. It should have openings, windows or doors, so related as to give free circulation in summer when needed, and yet not to promote draughts in winter. In size, it should correspond to the numbers in the family and their work. The large farm with dairy and fruit to handle, takes a larger room than the smaller farm devoted to fine stock or to grain, even if the persons using it are the same.

Conveniently opening into this living-room should be pantry, store-room, and cellar. No other wants of the household should interfere with this arrangement of rooms so closely related in use. At the same time, they should be near the kitchen proper, or cooking-room, which should be large enough to serve for wash-room in winter, and for all the coarser work of the farm-house. In summer, it relieves the living-room from the heat and confusion of the general cooking. In this room, the general sink and rain-water pump should find place, that plenty of soft water may be within easy reach of all.

To these first essentials, attach the family bedroom and a comfortable "best room," or parlor. The bedroom should be almost as large and airy as the living-room, and as far as possible from the cooking-room and stove, that even a sick person need not be disturbed by the busy hum of the house-work. The parlor need not be large nor elegant to be a great comfort to the housewife, and so to the whole family. It should not be, of course, a shut-away ornament, shown only to company; but it should have about it such a display of taste and neatness as to check the rudeness of children when they enter, and to gather in it the best thoughts and the pleasantest memories of what has made up our home. The two extremes of *common* and *company* use are to be avoided. Its use in the household should always have its meaning and show its fitness.

Arrangement of chambers above will need only the judgment to make them easy of access by stairways so placed as to accommodate both parlor and kitchen. Both front and back stairways pay their way well in any house for many occupants; and both should be comfortable, not steep or cramped. Above all, closets, ample in size and abundant in number, are essential.

For the shape of such a house, it is well to remember that more space is enclosed by the same wall in form of a square than in any other shape. It also brings the various rooms into neighborhood, and exposes least surface to the cold of winter and heat of summer. Yet, this form gives little outward beauty, unless the building is large and richly ornamented with window caps, pilasters and porches,— all expensive additions to the essentials of a home. Such deviations from a square as will break the long lines and require neatly arranged gables in the roof, are found to jibe with the interior plan described, and give a pleasing form to the outside. Such a dwelling of our beautiful Manhattan stone, with cornice painted in some soft-tinted drab or brown, is an ornament to the farm, however it is viewed; as expressing the tact, taste, comfort or means of the owner, or only as part of the landscape. With such a growth of orchard, shade, and shrubbery about it as a very few years of attention will give, it insures return of all its cost in money value, and throws in all the comfort and profit.

One who intends to build such a dwelling should keep some plan before him which, in general outline, suits his wants and means; then a happy thought will from time to time drop into their places the various suggestions of experience, until the whole house has been studied from the habits of those who are to occupy it. Finally, such a plan may wisely be submitted to a practical architect to adjust outside to inside, and supply those details which only an expert can see. —*President Fairchild.*

THE INDUSTRIALIST.

SATURDAY, FEBRUARY 26, 1881.

On account of the rush of institute work last week, the regular Friday afternoon lecture was postponed one week.

The Iola *Register* suggests that the chief duty of every Kansas farmer is to "kill a dog, and plant trees;" a statement which vibrates a responsive cord in our own breast.

At the social on Tuesday evening, Prof. Walters presented to the societies a handsomely executed painting of Washington. This gift was highly appreciated by the societies.

Any friend of the College who can spare copies of the report of State Superintendent of Public Instruction for 1867 and 1871, '72 or '74, will confer a favor by sending any of them to President Fairchild.

The far-reaching effects of the prohibitory law lately enacted, are becoming more and more apparent every day. A correspondent at Topeka writes us, that he wants a polled Galloway bull, as "horns" will be unlawful in this State after May 1st.

Messrs. Orner and Drought, members of the joint committee appointed by the Legislature to confer with the Faculty of the College in regard to the diseases of domestic animals, looked through the different departments of the College this morning.

It was pleasant to notice, while in Topeka this week, the evident high regard in which the "gentleman from Riley" is held by his colleagues in the House of Representatives. It is noticeable that when the gentlemen from this county talk, they say something, and have no lack of listeners.

The regular monthly lecture, by members of the Faculty, was delivered yesterday by Professor Walters, on the subject, "The Relations of Art and Industry." The lecture was a forcible setting forth of the Professor's well-known views on this important subject; and contained much valuable information, happily expressed. We hope that the readers of the INDUSTRIALIST may shortly be favored with an abstract of the lecture.

The social on Tuesday evening was in every respect a very pleasant affair. The attendance was large, nearly every student having been present, and the "literary" and musical exercises excellent. The singing was particularly fine; and we heard many complimentary expressions for the singing class and its teacher. The "literary" portion of the programme was well carried out. The orations, readings and dialogues were often mirth-provoking, and, in some cases, awe-inspiring on account of their fearful length. The audience, however, was not disposed to be over-critical, nor are we. Our voice is still for two socials per term.

All persons contemplating removal to Colorado, Wyoming, the Black Hills, Utah, Idaho, Montana, Nevada, Oregon, Washington or California, should correspond with J. W. Morse, General Passenger Agent Union Pacific Railway, Omaha, Nebraska, before purchasing tickets via any other line. Information of value, relative to routes, rates, inducement to settlers, etc., together with carefully prepared and reliable publications descriptive of the States and Territories named, will be mailed free upon application.

We clip from the Abilene *Democrat* the following programme of the Farmers' Institute, to be held at Abilene, March 4th and 5th, 1881:—

Hon. E. Brunson, Friday, March 4th, 2 P. M. Subject, "Thoroughbred Sheep." Discussion to be opened by A. L. Evers, A. M. German, and others.

Hon. Geo. T. Fairchild (President Kansas State Agricultural College), Friday evening, 7 P. M. Subject, "Education on the Farm and for Farmers." Discussion opened by Hon. J. S. Hollinger and T. C. Henry.

Prof. E. M. Shelton, of Manhattan, Saturday, March 5th, 9 A. M. Subject, "Tame Grasses." Discussion opened by Hon. O. A. Root, Thomas Purves and others.

Prof. G. C. Brackett, of Lawrence, Saturday, 2 P. M. Subject, "Profitable Fruit Cultivation in Kansas." Discussion opened by Prof. J. W. Robson, and Wm. Cutter, of Davis county.

Prof. E. M. Shelton (of Kansas Agricultural College), Saturday, 7 P. M. Subject, "Farm Experiments." Discussion opened by D. D. Baird and Samuel Wilson.

SOCIETY HALL, Feb. 19th, 1881.

At the usual hour, a goodly number of Websters, "tried and true," might have been seen flocking, not from all quarters of the globe, but from Manhattan and vicinity, to Society Hall, for the cultivation and improvement of their social and parliamentary abilities, as afforded by a first-class literary society. After the usual order of opening exercises, debate followed, which was decided by the judges in favor of the negative. After this the order of extemporaneous speaking was duly introduced. The *Reporter* was presented by F. A. Hutto; and the name of T. P. Bowen was proposed for membership. Secretary was requested by the Society to draw an order on the treasury to pay arrears on Chambers' Encyclopedia; also, an order for two dollars to purchase a work entitled, "From the Farm to the Presidential Chair." Question for the next session, "*Resolved*, That the Oklahoma settlers are justifiable." Affirmative, P. E. Smith and M. A. Reeve; negative, G. F. Thompson and D. S. Leach. *Reporter* will be presented in two weeks by Chas. Messenger. For declamation and select reading, in one week, Messrs. O. G. Palmer and J. C. McElroy. CALL.

The moot-court of the Alpha Beta Society was called to order by Sheriff E. A. Ward, Judge Failyer on the bench. After impaneling a jury, the court at once proceeded to take up the first case on the docket. This was a charge brought by one Gus Platt, against W. J. Griffing, wherein it was set forth that the defendant did on the night of January 16th, steal two chickens, valued at forty dollars. The case was opened for the State by F. M. Jeffery, assisted by W. J. Lightfoot. The attorneys for the defense were Messrs. Howard and Hopper. The prisoner plead not guilty, and endeavored to prove an alibi. During the examination of a witness, the prisoner created considerable excitement by making a bold dash for liberty, which he almost succeeded in gaining. He was, however, recaptured by the sheriff and his deputy, and brought back and kept closely guarded. After a rigid cross-examination of the witnesses, the lawyers began their pleading. The pleas were master efforts, and were listened to by the large audience with much interest. Judge Failyer delivered a well-worded charge to the jury, and they retired in care of the sheriff. During the absence of the jury, Judge Failyer was suddenly called away: he asked the judge from the sixth district, Judge Barrett, to preside. The jury, after balloting several times, returned a verdict of guilty, and the prisoner was sentenced to five years in the penitentiary. There being no further business before the court at that time, it was adjourned without date.

ST. CHARLES.

WINTER AND SPRING TERMS.

A winter term of twelve weeks begins on the afternoon of Monday, Jan. 3d, at which time applicants for admission will be examined. All should be prepared for examination in Arithmetic to percentage at least, and in elements of English, as well as in Reading, Spelling, Writing, and Geography. The regular first-year class will enter upon Book-keeping and U. S. History, continuing their study of the English language, by analysis of words and thoughts, and by exercises in expression.

Other classes will pursue the courses presented in the following arrangement of class hours:—

First Hour.—Geology, Horticulture, English Structure, and English Drill.

Second Hour.—Trigonometry, Chemistry, and Book-keeping.

Third Hour.—Logic, Geometry, and United States History.

Fourth Hour.—Zoology, Chemistry, Practical Agriculture, English Structure, and Arithmetic.

Fifth Hour.—Household Economy and Chemistry alternating, and Arithmetic.

Drawing and industrial classes will be so arranged as to accommodate the students.

Immediately after the close of the winter term, a spring term of ten weeks begins, during which the regular classes continue their course as follows:—

First Year.—Algebra. English Composition. Botany, with Drawing.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—Geology. Political Economy. Agricultural Chemistry.

Provision will be made for continuing classes less advanced than the regular first year; but all students entering at the beginning of the spring term, should be well advanced already in all the common-school branches. No beginning class will be organized.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procure books before coming can learn what are used by inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us. Its meetings are held on the first Friday evening of each month.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

All the members of the Faculty cordially invite consultation by the students upon any questions of study or work.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

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ADDITIONAL CLASSES.

In addition to the regular classes of my department, I was placed in charge, during the fall term, of a class of sixty-four second-year students in Hart's "Composition and Rhetoric." On account of the size of the class, it was necessary to conduct it in two divisions. The work of this class included the preparation and presentation, once each week, of written exercises, embracing letters, essays, descriptive sketches, news-writing, and similar composition. This was in addition to the written work proposed by the text-book.

During the winter term I had charge also of a class of twenty-four students of the third year, in rhetorical exercises, one hour each week. The work of this class included essays, declamations, readings, and mutual criticisms presented in writing.

The following summary shows the number and size of the several classes: —

Botany, third year	43	students.
Botany, first year	26	"
Horticulture, Entomology, third year	36	"
Zoology, fourth year	10	"
Rhetoric, second year	64	"
Rhetorical Drill, third year	24	"
Total	203	students.

ADDITIONS TO THE MUSEUM.

During the period covered by my report, there have been added to the collections in my care the following: —

TO THE ZOOLOGICAL MUSEUM.

By purchase: 31 mounted specimens, including 28 mounted birds, 2 mammals, and 1 reptile.

By collection: A miscellaneous lot of alcoholic specimens, principally reptiles and crustaceans.

By donation: A skeleton, supposed to be that of a Cheyenne Indian,— found in Ness county and presented by Major Henry Inman, of Larned, Kansas.

TO THE BOTANICAL MUSEUM.

By collection: Several hundred specimens, consisting of herbarium preparations, woods, abnormal growths, seeds, etc.

By donation: 500 species of North-American flowering plants, presented by the writer; 2 finely prepared sections of wood of red cedar, by Mark Reeve.

TO THE ENTOMOLOGICAL MUSEUM.

By collection: About 1,500 specimens, chiefly pinned insects and alcoholic preparations of larvæ, including also many specimens of insect work on trees, in wood, and other materials.

By donation: About 1,000 specimens, principally pinned insects from my own collections.

It is my intention to enlarge the illustrative and experimental collection of varieties of fruits as fast as opportunity will admit. On account of the pressure of other work, I gave less time to the furtherance of this object the past spring than it will receive in the future. However, I made a few additions to the lists, received principally in exchange for surplus nursery stock, a few being acquired by purchase. The additions are: Raspberries, 12 varieties; blackberries, 4; strawberries, 14; grapes, 4; apples, 28; apricots, 2; nectarines, 1 variety. I also received in exchange a number of ornamental trees, shrubs, and vines, which have been planted in appropriate places about the grounds, and in spite of the unfavorable season, are generally doing well. A few pines and spruces were purchased and planted. A number of trees from the rows bordering the walk to the Society Hall, have been transplanted to places where they were needed.

Two large beds on the lawn were set with a variety of bedding plants, some being old and well-tried varieties, others new. The dry weather at the time of planting and for some time after, and the work of insects, somewhat interfered with the success of these beds: the successful portion will furnish hints for future planting of this kind. The partial failure is in a large degree attributable also to the unfavorable state in which the plants necessarily were when received from a long distance. We greatly need facilities for the propagation of tender plants, both flowers and vegetables. Hot-beds are only available to a limited extent, and are too uncertain in results, requiring constant attention in severe spring weather.

The student labor employed about the grounds under my direction has been expended in part as intimated above, and also in attending to previous plantings. I found the need of a great deal of work in the orchard: it had apparently lacked proper attention for some time. During the winter we were employed in digging out dead trees, pruning, and clearing out generally. Later in the season, vacancies were filled by planting trees of varieties not represented in the collection, and a portion of the north block was seeded to orchard-grass. The remainder of the orchards have been kept in constant cultivation with plow and hoe, up to date. During the coming season, I propose to seed a large portion to grass, and will give the remainder different modes of treatment, manuring, cultivation, in different parts, with a view to a comparison of results. I planted as large a list of varieties as I could readily obtain of each of a few kinds of vegetables, to test and compare their values on our grounds, and also to serve as material for certain trials that I am making, but upon which a report cannot at present be made.

I have also located and begun the planting of an arboretum. This will be found on the slope east of the vineyard. For economy of space, and for convenience, the trees will be planted in nursery rows, arranged, so far as consistent with their respective modes of growth, in accordance with natural relationships. This tree nursery will be the source from which can be obtained trees for removal to the lawns, as they are needed.

A definite part of the work about the lawns and buildings, has been in my care, including all mowing with the scythe, trimming about the walks and roads, keeping the lawns free from weeds, and the care of the trees. This has called for the expenditure of more time and labor than would at first sight seem required; but I think it well repaid in the appearance of the grounds.

I have entered into a systematic re-cataloguing of the orchards and vineyard. This is all the more necessary on account of the total lack of such reference for the vineyard, and for a part of the orchard. Most of the trees have set sufficient fruit to enable me to identify those not listed, and to verify others. After all has been done that can, there will remain a few young trees that cannot be identified. I hope to have a satisfactory record ready for presentation in my next report.

As I was placed in charge of the department after the beginning of the fiscal year, I am unable to present a systematic financial report.

Respecfully submitted.

E. A. POPENOE,
Professor of Horticulture.

Crossing Wheat.

The sexual construction of the wheat plant and its habits of reproduction, are remarkably interesting. It is commonly supposed that two varieties of wheat sown near together will mix. This opinion is not true, for wheat cannot mix in this way; and yet, cases have occurred in which it has appeared that they have done so. For instance, a white wheat is planted near a field or a plot in which red wheat is sown. The facility with which wheat changes its appearance will often, and has sometimes made the red wheat lighter and the white wheat darker; and this has led to the supposition that the two had mixed. But the habit of growth of the wheat plant prevents such an occurrence; for fertilization takes place before the glumes or chaff open to permit the anther, which bears the pollen, to extrude itself. Besides, the anther sheds its pollen before it emerges wholly from the glume; and the pollen falls directly downward upon the pistil at the bottom of the glume, and thus fertilizes the ovule or embryo seed. Every glume on the ear is closed very tightly at this time, and the pistil within cannot be reached without forcing open the glume or chaff. Thus every single grain is self-fertilized, and the variety cannot be changed by impregnation from an outside source without some artificial help. This help is given in the operation of crossing or artificial breeding, often called hybridizing, but wrongly so, because a hybrid is a cross between species and not varieties. For instance, a cross between sheep is a cross, and that between a sheep and a goat would be a hybrid; so a cross between one variety of wheat and another is precisely similar to the crossing the Ayrshire and Jersey breed of cattle together, and cannot be truly called hybridizing. The operation of crossing is a delicate one, and requires very great care and nicety. It is as follows: Before the anthers have emerged from the glume, this is opened, and the three anthers contained in it are cut off with fine scissors and removed. After this is done, pollen from anthers of the variety chosen to cross with, are applied to the pistil which has been deprived of its accompanying anthers. The pollen grains falling on to the pistil, which is much like a feather, adhere to its glutinous surface, and are absorbed into the ducts which carry them to the ovule, with which they immediately coalesce and become united. The ovule then begins to swell and grow until the seed forms and becomes mature. In this way, several experimenters are diligently occupied in producing new varieties, which they are able to do with as much certainty of reaching desired results as the breeder who crosses his cattle, sheep, or pigs. The laws which govern the reproduction of animals, are the same for all practical purposes as those which control the reproduction of plants; and the effects of crossing varieties are as marked in the one case as in the other. Some of our best varieties of wheat are crosses; and there are hopes that very great improvements in the character of wheat as regards hardiness, prolificness, and freedom from depredations of insect pests, may be made from time to time.— *Capital.*

KANSAS STATE
AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere: —

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

INDUSTRIAL ARTS.— The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.— Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.— The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,— attention being paid to spelling and to short and precise expressions in messages,— abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.— Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

Instrumental Music.— Provision is made for the teaching of music upon instruments of all sorts. The College furnishes piano and organ for practice, but the teacher depends upon his pupils for his income. Lessons may be weekly or semi-weekly, and all practice at the College must be under the direction of the music teacher. Weekly lessons are sixty cents each; semi-weekly, fifty cents each. Students in a class of two or more can receive instruction at reduced rates, as the number may warrant. Harmony and composition are taught if desired.

F. G. Adams

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI MANHATTAN, KANSAS, SATURDAY, MARCH 5, 1881. No. 29.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Our Exchanges.

It is supposed that there is a gang of hog thieves somewhere between here and the south line of the county. Thomas S. Ewing has lost 70 head in one night; and others in the neighborhood have been taken to the amount of over 100 in all.—*Frankfort Headlight.*

A new game law has been enacted by our Legislature, which provides that it shall be unlawful to kill or trap any wild bird except the wild goose, duck, hawk, crow, curlew, owl and snipe, under penalty of from $10 to $30. It is provided, however, that any kind of game, except quail, may be shot on one's own premises from Sept. 18th to Feb. 1st.—*Wyandotte Gazette.*

Upon the receipt of the intelligence, in Emporia yesterday morning, that the Supreme Court had sustained the constitutional amendment, and that it did not invalidate the penal portions of the dramshop act, all liquor stores and saloons in Emporia were immediately closed. On the door of the "Health Office" was a card over the name of Major Davis, saying: "I have closed this place because I have to."—*Emporia Journal.*

Young men who are intending to be farmers should remember that agriculture is both a science and an art, to be carefully studied and then practically carried out. The day has gone by when the ignorant can become successful farmers. Within the past ten years agriculture has undergone a great revolution; but the next ten years will see greater changes than have yet been witnessed. The leading agriculturists will be the leading men of the country.—*Leavenworth Times.*

The Kansas River Barge Company, under the management of W. H. Jordan, with a capital of $7,000, is now ready for work, to put in operation one steamer and a line of barges, on the Kansas River. It is expected to make the first through trip by the fourth of July. We are glad to hear of the execution of this grand enterprise. There is certainly water enough in the Kansas river, from Fogarty's mill to Kansas City, for navigation purposes, if it can only be confined to a proper channel.—*Junction City Tribune.*

That sorghum undoubtedly grows to perfection in Kansas, as it does in Illinois, Iowa, and other western States, is a fact. But there is one almost insuperable obstacle to the successful manufacure of syrup or sugar from the cane. While the chintz-bugs do not injure the cane itself, they imbed themselves between the stalk and the closely grown part of the blade; and, in crushing the cane, the bugs are mixed with the juice, and ruin the flavor of the syrup. If this obstacle could be overcome, the manufacture of sorghum in Kansas will become an industry of immense proportions.—*Abilene Gazette.*

Many of the young men nowadays who are looking around for "a job," want something soft and easy. With snappy abbreviation, they call the "situation" they seek a "sit;" and that is exactly the size of their aspirations. They speak wiser than they know. To sit down somewhere would, of all things, suit them best. Where there is one earnest man eager for honest, solid work, you will find a dozen who propose to give the minimum of labor for the maximum of pay. The dignity of drudgery, the heroism of toiling at a task, the chivalry which prompts one to do a man's part in the world's work, are conceptions that by no means enter as they ought into the plans of life current among the "rising generations."—*Leavenworth Times.*

Some Considerations on the Management of Fairs.

[A Paper read before the Central Kansas Breeders' Association, at Manhattan, by Gen. J. C. Stone, of Leavenworth.]

The unusual number of agricultural fairs, which have been held during the past summer and autumn, have afforded excellent opportunities for observing their methods, and estimating their results. In the thought which should underlie all competitive exhibitions, as in the method of work, there has been not only no useful advance, but probably a retrogression. Some which formerly held a respectable position as exponents of county or neighborhood industries, have degenerated into mere betting rings; and in none has there been observed any new arrangements by which they could be rendered more useful.

CULTIVATE THE PEOPLE.

The governing object in holding an agricultural fair, should be to *cultivate the people* by bringing together the best products of industry, and to show by the awards what is the judgment of the best men. By this means, every producer is enabled to see in one day, what would cost him perhaps weeks of time and labor to find and inspect at the place of production. An opportunity is given for learning the methods pursued, and seeing the results accomplished by the most successful producers, and each in his sphere is stimulated to adopt better systems, and, at the same time, is taught how to use them. Improved stock, grain, fruits, implements, and goods of every character, are easily examined, and each receives the benefits derived from the comparisons made and accounts rendered by the judges, who are supposed to be of especial skill, each as to the article or animal he is called to decide upon.

Subsidiary to this grand object is the reunion of neighbors and citizens of the same county or State, who, under our present civil and social arrangements, have but few other opportunities for large social interviews free from all political, theological, or other dividing influences. Also a useful means is furnished by which those who are progressive and have achieved more than others, may gratify a laudible ambition by showing what they have accomplished, and benefit the community by inciting others to do likewise.

That most of our fairs, as at present managed, do not even attempt the role we have sketched, no thoughtful man who has given them attention will deny; and it is of great importance to so change the views and methods of those who control them, that they may if possible fill the measure of good to the people, of which they are capable. The stereotyped answer to every suggestion of change for the better, is: "It will not pay: you must have what will

DRAW A CROWD;"

and this has been repeated until the important question discussed by those who control these associations, is what will draw a crowd; and it has come to be regarded as an axiom that no fair will pay unless a large crowd can be induced to attend.

Usually, active business men in the town are selected as officers; and it often happens that, in their anxiety to gather as large a crowd to their town as possible, they lose sight entirely of the prime object, which should always be the improvement of the country, by educating the people to a larger and more profitable production. They first assume that without a large crowd, expenses cannot be met, and then proceed to do whatever, in their judgment, will bring a crowd.

We affirm that these fairs can be managed so as to subserve the high purposes for which they ought to be held, and, at the same time, pay not only their necessary expenses, but accumulate a fund for permanent improvements; and in all this country there is no better field for this advance than Kansas.

OUT WITH THE SIDE-SHOWS.

We say nothing against public gatherings held for amusements, or for other purposes; but it is certainly a misnomer to call a horse-trot or a military drill an agricultural fair. Let meetings for such purposes be held wherever and whenever they are desired, but bring back the fair to its legitimate use; viz., the education of the people in the direction of the improvement and increase of the stock and products of the country, thereby increasing wealth and comfort.

First of all things, we should rigidly exclude all gambling devices, side-shows of every kind, pool selling, political or other speech-making, military drills, baby shows, or any other display or device not germane to the object of the exhibition.

REPUTATION, NOT PREMIUMS.

Offer no *extravagant* premiums for anything. Make the list of articles competing as large as possible, but let all the premiums be small. When it is understood that exhibitors expect to make reputation from their exhibits, a better spirit will be maintained and a healthier competition had than when they show for profit. For the same reasons premiums should be always given in plate and never in money. Money received may vanish with the other profits of the exhibitor; but a piece of plate with an engraved statement upon it is a perpetual reminder of the honor obtained, and a constant incentive to children and neighbors to follow in the same track. The offering of large premiums in money has created a class of professional exhibitors, who travel from State to State wherever these large premiums are offered. These men can afford to ruin, by over-feeding or otherwise, the stock they use for this purpose, as the premiums they take often far exceed the real value of the animals, while their exhibits not only do not stimulate others to improve, but on the contrary, for obvious reasons, hinder it.

Looking in the same direction, it has often been found a wise arrangement, in well-conducted fairs, to require exhibitors to pay an entry fee equal to ten per cent of the premium for which they compete. Where the premiums are small, it has been found that this was not objected to, and often secured the amount of the premium without charge to the society.

Let all second premiums be by honorable mention only.

ENCOURAGE USEFUL HOME PRODUCTS.

Confine the premium list very strictly to such products as can be profitably raised or manufactured in the region for the benefit of which the fair is held. We often see a large premium offered for the greatest number of varieties of certain fruits, thereby inducing horticulturists to cover their tables with a mass of rubbish, when every intelligent man among them will say that the number of useful varieties is limited. It is not meant to exclude new kinds, but only to see that they are useful as well as new, before they receive the endorsement of an agricultural or horticultural society.

An innovation, which it would seem wise to make in many cases (perhaps not at all), would be to permit no competition for premiums at county fairs, by owners or producers outside the county. It has often happened that such outside competition has prevented improvement in certain counties rather than encouraged it, especially in stock and manufactured goods; and it has usually been found that competition among imme-

diate neighbors, was more beneficial than any other.

ENTRANCE FEES.

The gate fees at county fairs are usually too high. They should never be over twenty-five cents for each person, and there should be no charge for vehicles. Farmers and persons with limited means should be encouraged to come with their families early in the morning, and spend the whole day in examining the stock and products, bringing their own lunches with them; and thus their wives and children can participate with them in the social intercourse, and enjoy with them the improving influences by which they would be remembered, instead of rushing out in the afternoon for a sight at a horse-trot, which is over in a few minutes, and about which they learn little or nothing.

THE SWEEPSTAKES HUMBUG.

We often find in the premium lists of the last few years one for the best cow or bull "of any age or breed," and sometimes a large one is offered. There would be as much prudence and propriety in making a premium for the best live animal of any size or breed, and allow all beasts to compete as to send judges into a ring to decide between a Short-horn and a Jersey.

THE JUDGES.

Another vicious practice has obtained wide adoption, which ought to be discarded. Judges are now usually required to make their decisions by ballot, and no one permitted to discuss animals or produce before them. The spurious reason alleged is, that if discussion is permitted, the opinion of one might be of too great weight with the others. This, if true, is the best possible reason for discussion. If three judges go into a ring and one is competent to decide which is the best, and to give a good reason for his opinion, surely his judgment is far more valuable than the opinions of the other two, or of a dozen such, and ought to outweigh them.

It should be presumed in all cases that judges appointed are gentlemen, and that in making their decisions they will be guided by their honest convictions; and they should be treated and trusted as gentlemen until it appears that they have been influenced by dishonorable motives, and then they should be promptly and fearlessly exposed.

Another obstacle to success is that our county fairs are usually held open too long. Two days, or at most three, is as long as is possible to maintain the interest of an ordinary county display; and the attendance will be better when a shorter time is allowed.

TELL HOW IT'S DONE.

In one very important particular, our fairs have never been able to accomplish as much good as is desirable. It has always been recognized, that while the display of a premium article or animal was useful as a model and an incentive to others, yet it could not accomplish its full measure of usefulness unless the manner of its production could be set forth in plain terms easily to be understood and easily to be followed. Our most ingenious producers, breeders, and feeders, are often bunglers with their pens; and it has been found impossible to induce them to record their methods in a clear or attractive shape. In order to remedy this capital defect in our system, it would be necessary to appoint for each association a special secretary, whose business it should be to gather from the exhibitor of each premium animal or article a complete history thereof. If an animal, give its pedigree as far as could be ascertained, the mode of raising from birth, the kind and quantity of feed consumed, and every fact which would be useful to one wishing to imitate it. If grain or fruit, he would ascertain the kind of seed used and the mode of selecting it, methods of cultivation, or as full as would be useful. One such report, made by a competent and careful man, would be of more real service to the farmers, producers, and manufacturers of Kansas, than all the fairs that have been held within its borders since the settlement of the State, or that are likely to be held in the next decade as they are now conducted.

We are all aware that the gamblers and pool-sellers will, with one voice, deny all this as impractical; and declare that the people would not attend a fair so conducted, that there would not be funds enough to pay the premiums, etc. To this, there is one all-sufficient answer: —

ONE LIVING EXAMPLE

is worth a thousand theories. The Agricultural Association of Bourbon county, Ky., is the oldest and most successful county association on this continent. They have just closed their forty-third annual exhibition. In all these forty-three years, this exhibition has never been omitted. Even during the war, no matter by what troops their little city of Paris was occupied, the fair was held. They have owned and used the same grounds from the beginning; and there is not and never has been a track for trials of speed upon it. The tables of Bourbon county farmers are loaded with plate honorably won at its displays, and proudly kept as mementoes of skill and success in their calling; and the careful culture, the magnificent stock, and the garnered wealth of that grand old county, are largely due to the beneficent influence of this unrivalled association, of which the honorable Brutus J. Clay was for twenty-six consecutive years the president.

SO MAY KANSAS.

The fame of such an example is sought to be broken by the fact that Kansas is a new State, that our people are not yet familiar with good stock, etc., as those of such a county, and therefore could not be brought to take an interest in such products without some claptrap is used to draw the crowd. There are more than twenty counties in this State, any one of which contains more good stock to-day than Bourbon county had forty-three years ago; there are more than twenty counties with a larger population than it has to-day; and there are more than fifty counties in this State with a greater producing power,—each of which would be richer and more prosperous than that famous county, if wise and careful men could concentrate their attention upon those products which are valuable in themselves and useful, elevating and ennobling to the producers, and cut loose from those which foster the spirit of gambling.

The brightest of all futures is among the possibilities of Kansas farming, though much of the success that future shall bring, rests largely with those who control and manage our agricultural displays.

THE INDUSTRIALIST.

SATURDAY, MARCH 5, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Chemicals and Chemical Apparatus for Common Schools.

We are pleased to notice that there is an effort, on the part of many of the advanced city schools of the State, to depart from the time-honored custom of teaching chemistry from books alone, without even chemicals to show the class (thus giving an idea of the physical properties of the substances of which they read), or to illustrate the reactions said to take place when certain substances are brought together under proper circumstances, much less to let the pupils put these substances together and bring about the required conditions to get the desired reaction. They are catching the spirit of the age; and see that the pupil cannot, by merely studying a book, know what others have done, in the same sense that he knows it from seeing the thing done, or, still better, from doing it himself. And so there is a growing desire to procure such apparatus and supplies as the finances of the district will justify. In many cases, it becomes a question how and where to procure the chemicals and apparatus which will entirely meet their wants, and this at a low figure. Often a "set," put up especially for these schools, is purchased. These sets are generally designed for the experiments in certain specified text-books. This is doubtless an advantage in certain contingencies; but the teacher should be able to order from a catalogue such articles as are needed.

I have just been making an estimate of the real value of one of these sets. It sells at $17.50. The value at retail rates, as shown by catalogues, is $5.90. The amount of the several articles, and not the prices, are given. It is amusing to note the small quantity of some of the substances furnished in this "set." One-eighth of an ounce of carbonic disulphide is an illustration. This substance sells at fifty cents per pound. One-eighth of an ounce is worth nearly five mills. In a few other cases, less than a cent's worth of a substance is given. More than half of the chemicals are in amounts of three cents' worth and less. As this is a cheap set, it shows to a greater disadvantage than more costly ones, but the same principle is shown in all. Now, the dealers may be pardoned for taking this very liberal profit. They must have pay for weighing out such small quantities. The school will find it a very profitable investment to purchase in larger amounts. The saving on sets will go far toward paying for the larger quantities. Even if not all the chemicals are used up this year, they will keep till next. But the advantage will not be a pecuniary one alone. Larger supplies mean better results in the schools.

School officers contemplating purchasing chemicals or chemical apparatus, cannot do better than to procure catalogues from reliable firms; such as, Bullock & Crenshaw, Philadelphia; Powers & Weightman, New York; E. S. Ritchie & Sons, Boston, Mass., and numerous others. From this make out a list of needed supplies, and get their rates. They will generally give a discount from catalogue prices. The teacher, from a few articles, such as glass tubes, rubber tubes, clay pipes, &c., can often make many of the simpler pieces of apparatus. He can use ox bladders for gas bags, old gun barrels for retorts for generating oxygen, illuminating gas, &c., clay pipes for making blow-pipes and deflagrating spoons, &c.

A little mechanical ingenuity, by which we mean the ability to design and especially the skill to construct, must always constitute a large portion of these school laboratories, as in all others. He who must follow all minute directions of the books, using four-ounce flasks when it so directs, or glass tubes of just so many millimeters in diameter and length for the same reason, will succeed but poorly in teaching any of the sciences, and more especially in teaching chemistry. Of course, a neatness and exactness is requisite; but this exactness is to be observed in other things than the unessentials, where it is so often met.—*Prof. Failyer.*

The Study of Minerals in Common Schools.

None of the natural sciences can be taught more successfully, with the facilities to be found in high schools, than mineralogy, so far as obvious physical and simple chemical properties of minerals are concerned. Blow pipes costing two cents each, lamps or candles, charcoal, a few bottles of acids, soda, borax and cobalt solutions, with a specific gravity balance, are all that is really essential. A few minerals can be procured in any locality. A system of exchange would supply schools with all the minerals native to Kansas. Others can be procured by the pound from dealers in cabinet specimens. Of course, a few fine crystals of the rarer crystalline minerals would be obtained by purchasing in bulk. But these would be just the thing for study of physical and chemical properties. A few typical crystals could also, by special contract, be obtained for illustrating the crystalline form. At least, the exchange of specimens above suggested, would be an excellent way to procure a small school cabinet at little cost. Even if the systematic study of minerals is not at once begun, the cabinet is to a great extent educational in itself. Let us have these cabinets, at least in the school in each county seat.—*Prof. Failyer.*

Educational Gossip.

Augusta wants a reading-room.

Wichita has a Shakespearean club.

"I think that that that that that boy has written is the best that on the board," said a teacher the other day, in his class.

Several papers of the State contain items speaking of the building of a gorgeous new school building at Manhattan. The statement is not a fact.

Some one stole the entire coal supply of the Medicine Lodge school last week, forcing thus the entire educational machinery to stop.

The State Normal School at Emporia was obliged, several times this winter, to suspend operations on account of its heating furnace.

Kansas has a permanent school fund of nearly two million dollars. Nearly three millions of acres of land were granted for this purpose, which will secure, when entirely sold, a fund of about $10,000,000.

The world moves. The other night a lecturer claimed that before a boy is taught Greek, he should be filled with the horrors of debt. Usually, the schools leave the virtues to the last, and then forget to teach them.—*Leavenworth Times.*

A physician who has given a great deal of study to the subject of woman's progress, publishes his conclusions in the New York *Times.* He says women are improving mentally but retrograding physically. He thinks American women particularly are not now as robust as they were a hundred years ago.

Prof. Price is going to publish a book in a few weeks, which, we believe, he will call the Annals of the Southwest, or something like that. Anyhow, it will be a review of the early days of the little towns scattered through this part of the valley. Such a book as this will be a genuine treat.—*Wichita Republican.*

The Newton *Golden Gate* tells a blood-curdling tale of a fight between a rural teacher in Harvey county and five or six big boys. The teacher, an experienced and well-educated man, was knocked down with a stove poker, badly beaten, and had his arm broken twice. A few years of reform school distributed among the crowd, would be the proper medicine.

The Holton *Recorder* thinks elections for school offices ought to be held earlier in the year. It says: "The schools generally end in June. It is to the interest of the schools as well as teachers that the school officers that run the schools for the next year be ready to employ teachers. It is generally the case, that teachers are compelled to wait in uncertainty until within two or three weeks of the time school is expected to commence, before they contract."

Geo. W. Martin advertises in the *Capital* that there are but few copies of the "Annals of Kansas" left, and that he would like to dispose of them at the price of $5.00 per copy before retiring from the State printing-office. There being only a limited edition of them, and no possibility of a reprint of the work or even anything like it, we sincerely advise librarians and citizens interested in the early history of the State, to take the opportunity and get a copy. In twenty years, this valuable work will be worth $25.00 a copy.

As the question, whether or not teachers can draw pay for holidays, is one on which opinions differ very widely, and as the school law says nothing on the subject, we referred the question to State Superintendent Speer, and received the following: —

"With reference to your question on holidays, I would say that a teacher is not entitled to compensation for time commonly called holidays, without teaching. But I am of the opinion that if a teacher is ready and willing to teach on holidays, and the school is suspended by the board (no mention being made of it in the contract), the teacher would be entitled to pay, or have them included as part of the time contracted for."—*Hutchinson Interior.*

Occasionally a few head of buffalo are found straggling on the outskirts of civilization; but the wild bison is nearly extinct.—*Dodge City Times.*

A fellow sold a load of wheat in Clifton the other day, and secreted in the wagon a large stone weighing about thirty pounds. There must be such a thing, then, as "cheat" in wheat.—*Waterville Telegraph.*

THE INDUSTRIALIST.

SATURDAY, MARCH 5, 1881.

The grade cards for the first half of this term have been mailed this week.

The President's office sports a new and well-made book-table,—a job that speaks well for the Mechanical Department.

Prof. Ward's class in English analysis is at present studying word derivations. Every shelf of the library has been ransacked this week for dictionaries and histories of the language.

The friends of Lewis Salter will be glad to hear that he is prospering. In addition to farming the parental homestead, he has also lately embarked in the agricultural implement business.

Prof. Platt's class-room has been provided with new blackboards. In our next issue, we will publish a new recipe for making the best blackboard in creation,— such as the Professor now has.

Among the many catalogues of seed-houses and nurseries which flood our reading-table, we notice that of a Kansas institution, A. Whitcomb, of Lawrence. The business is confined to bedding and greenhouse plants; but in this line it is very complete. We advise our lady readers to send for the pamphlet.

President Fairchild and Prof. Shelton went to Abilene yesterday to attend the Dickinson County Farmers' Institute. From the programme of the Institute, we see that they will be among the active members. The President is billed for Friday evening, with "Education on the Farm, and for Farmers;" and Prof. Shelton, for Saturday forenoon, with "Tame Grasses," and for the evening, with "Farm Experiments."

The class in mineralogy, which numbers sixty, recite in two divisions. Two hours is given each of these divisions. One hour is devoted to the study of known minerals, by aid of lecture abstracts provided by the hectograph process. During the other hour, minerals are determined by use of blow-pipe and reagents. It is interesting to note the zest with which most of the students enter upon this blow-pipe work.

The new gasoline apparatus for the laboratory has been ordered from the Combination Gas Machine Co., of Detroit, Mich. Besides furnishing the necessary flames for the classes in chemical analysis, and the Professor's private laboratory, it will ultimately be used to light the whole of the building. For the present, however, only about forty jets will be provided, confined to the work-benches of the analytical laboratory. It is designed to have it in working order by next spring term.

SOCIETY HALL, February 26th, 1881.

Society convened with Pres. Myers in the chair. After roll-call and devotion, J. D. Needham was initiated, and the name of T. P. Bowen was balloted on for membership. J. C. Allen and L. H. Neiswender were appointed to fill vacancies in debate, which was decided in favor of affirmative. A resolution was adopted that a committee of three be appointed to confer in regard to holding a special session at end of term. W. Knaus, M. A. Reeve and J. C. Allen were appointed. Programme for next session is as follows: Question, "*Resolved*, That education has done more toward civilization than has religion." Affirmative, J. D. Needham and J. C. Allen; negative, W. H. Meek and W. Knaus. Declamation by O. G. Palmer; select reading, J. C. McElroy. After report of critic and reading of minutes, the Society adjourned. CALL.

SOCIETY HALL, March 4th, 1881.

Society called to order by the President. Devotion by F. M. Jeffery. The debate was closely contested, but Miss Pope's able speech decided the question in favor of the negative. After some quibbling about passing extemporaneous speaking, it was taken up and indulged in with the usual interest. A creditable number of the *Gleaner* was presented by Mr. Barrett and Miss Short. Under the order of reports of committees, the picture committee presented an "eloquent" report. A unanimous vote of thanks was tendered Prof. Walters, for his donation to the societies of a fine portrait of Washington. Duties for next week: Debate on the question, "*Resolved*, That Washington deserves more honor for defending America than Columbus for discovering it." Messrs. Walden and Jeffery on the affirmative; J. F. Stricker and C. F. Barrett on the negative. *Gleaner* in two weeks by Mr. Hopper and Miss Lightfoot. Society adjourned. ST. CHARLES.

FRIDAY, March 4th, 1881.

The Scientific Club was called to order by Pres. Popenoe. An interesting paper was presented by Mr. G. Hopper, upon the subject, "Tree Pruning in Kansas." The question was handled from a practical, Kansas standpoint, and called forth an animated discussion from the members. A series of resolutions were then offered by the executive committee, the substance of which was the division of the Club into the following sections: Section (*a*), Archælogy; Sec. (*b*), Biology; Sec (*c*), Chemistry; Sec. (*d*), Physics; Sec. (*e*), Engineering; Sec. (*f*), Zoology; Sec. (*g*), Geology.

The Club as a whole is to constitute section (*a*); while each member is required to enroll himself in one, and may in two, of the remaining sections. Each section may elect its chairman, and arrange its own meetings at pleasure, and is required to present one paper at each regular meeting of the Club. After a thorough discussion, the resolutions were adopted and the Club adjourned. Students of the College and others interested are respectfully notified that the members of the Scientific Club do not lay claim to any exhaustive amount of scientific culture, but are simply learners; and any one interested in these pursuits is cordially invited to unite with us in this work. M. S. C.

The month of February was remarkable for several severe storms, as well as for the unusually low temperature that prevailed during the greater portion of the month.

The average temperature of February for a series of years is 31°.89. The average rainfall is .99 inches.

The mean temperature of the February just closed, is 22°.2. The mean at 7 A. M., 15°.2; at 2 P. M., 28°.5; at 9 P. M., 22°.5. It will be observed that this month is 9°.7 below the average February temperature. The lowest temperature of the month was 13° below. This occurred on the 16th. The maximum temperature, 44°, was observed on the 25th.

About ten o'clock of the 5th, a gentle rain set in, with the wind in the southeast. This changed to sleet in the night, and finally to snow, the wind veering to the northeast. The snow continued through the 6th, melting to such an extent that not more than four inches of snow remained on the ground. But 2.06 inches of water were collect-in the gauge.

On the 11th, a snow fell, which was estimated at six inches in depth; but it drifted to such an extent that an approximation only could be made. On the 14th and 17th, occurred more snow. The entire fall during the month was 14 inches; entire rainfall, 2.75 inches. The mornings of the 25th and 26th were foggy.

The mean barometer was 28.63; lowest, 28.24; highest, 28.97.

The wind was northwest at seventeen observations; southwest at seventeen; northeast at twelve; east, ten; north, ten; southeast, nine; south, five; west, four.

The per cent of cloudiness at 7 A. M. was 63; at 2 P. M., 54; at 9 P. M., 40.—*Prof. Failyer.*

PARLIAMENTARIANISM.

In the course of human events, it once more becomes necessary for ye reporter to manipulate his faber in an effort to chronicle the progress of the Drill Club. There was no session last week, owing to the College social, which was held in commemoration of that exemplary stripling of humanity who, with his little tomahawk, hewed to the line, regardless of where the cherry trees fell, and then, Washingtonian like, acknowledged the commission of the depredation. The simplicity of this confession by Georgie, caused his name to be emblazoned on the annals of time, as a youth worthy of emulation; and he will continually be proudly pointed to by doting parents as the "pink of perfection," in their efforts to check the rebellious spirit of the typical American youth of this and future generations. This allusion to the "father of our country," will be pardoned, when it is known that a *fac simile* representation of that honored and valiant patriot now adorns the walls of Society Hall. For this magnificent present, the societies, and particularly the Drill Club, are indebted to the skillful brush of Prof. Walters, and for which words fail to express their gratitude; but all unite in pronouncing the Professor an artist "to the manor born."

From the serious tediousness with which matters are being transacted, it is quite evident that the members are rapidly gaining a clear conception of many of the mystified principles of parliament; and they are making effective use of their knowledge in the attainment of desired ends, in the proceedings of the Club. The inability of President Knaus to be present, gave "Judge" Barrett, of moot-court fame, "from the sixth district," an opportunity to display his ability in conducting the exercises of the evening. The "Judge" acquitted himself creditably, and proved himself the possessor of considerable executive ingenuity.

The Club expressed their appreciation of the merits of the present incumbent of the chair by re-electing him for another term. Out of several choice candidates, and frequent consultation of Roberts' Rules of Order on those points by which success might be secured, Miss Rebecca Coburn was elected secretary. In competency and personal appearance, perhaps a better selection could not be made; and, in these respects, she will doubtless sustain the commendable reputation established by her predecessors. Mr. Mell Platt succeeded in dignifying himself with the honors of marshal, for which position he is eminently qualified.

Engrossing parental duties necessitated the resignation of Superintendent A. A. Stewart as umpire of the Club; and President Fairchild kindly assumes the duties of the position. Several more additions were made to the roll of membership.

HORATIUS.

The Manhattan INDUSTRIALIST, by the Faculty of the Agricultural College, though small, is a highly prized exchange. The matter is choice, and the paper is a model of typographical beauty.—*Olathe Gazette.*

WINTER AND SPRING TERMS.

A winter term of twelve weeks begins on the afternoon of Monday, Jan. 3d, at which time applicants for admission will be examined. All should be prepared for examination in Arithmetic to percentage at least, and in elements of English, as well as in Reading, Spelling, Writing, and Geography. The regular first-year class will enter upno Book-keeping and U. S. History, continuing their study of the English language, by analysis of words and thoughts, and by exercises in expression.

Other classes will pursue the courses presented in the following arrangement of class hours: —

First Hour.— Geology, Horticulture, English Structure, and English Drill.

Second Hour.— Trigonometry, Chemistry, and Book-keeping.

Third Hour.— Logic, Geometry, and United States History.

Fourth Hour.— Zoology, Chemistry, Practical Agriculture, English Structure, and Arithmetic.

Fifth Hour.— Household Economy and Chemistry alternating, and Arithmetic.

Drawing and industrial classes will be so arranged as to accommodate the students.

Immediately after the close of the winter term, a spring term of ten weeks begins, during which the regular classes continue their course as follows: —

First Year.— Algebra. English Composition. Botany, with Drawing.

Second Year.— Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.— Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—Geology. Political Economy. Agricultural Chemistry.

Provision will be made for continuing classes less advanced than the regular first year; but all students entering at the beginning of the spring term, should be well advanced already in all the common-school branches. No beginning class will be organized.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductiye. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the deve opment of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids. gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, MARCH 12, 1881. No. 30.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Report of Department of Elementary English and Mathematics.

1878–9.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—Permit me to submit the following report of the classes taught in my department of the College during the year closing June 30, 1879.

During the fall term of 1878, I taught classes in English, arithmetic and algebra. The class in English numbered forty-eight, and was taught without division. The class in arithmetic numbered fifty, and recited in two divisions. The class in algebra numbered seventy-three, and was also divided.

During the winter and spring of 1879, I taught classes in English structure, United States history, and advanced arithmetic with book-keeping. The class in structure was composed, chiefly, of students who had been in the English of the previous term, and numbered forty-six. The class in history numbered sixty-seven, and the class in book-keeping eighty-seven. Each of the two latter classes was divided into sections, occupying two different hours for recitation.

In reference to the class in English, I may say that, after an experience of more than twenty years in trying to teach the science and art of using the English language, it is still a difficult problem to decide upon just the best line of work to pursue in teaching a given class for a limited time. During these twenty years, I have varied my method of teaching from spending nearly the whole time upon the science of the language, giving very little to the art, to the opposite extreme of occupying almost all of the time in the practice of using the language, and spending little upon the principles underlying the correct use of it. For practical purposes, aside from that of teaching, I believe the latter method is the better of the two extremes; for it is of more use to be able to write one's thoughts upon a subject with clearness and ease, and in conformity with good usage, in a penmanship that is legible, than it is to be able to parse all the words in a given sentence, without the ability to use good language readily. But I am convinced that enough of the science should be taught to give the student the ability to know why his language is or is not in agreement with established usage. Many of our students come to us, from fifteen to twenty-four years of age, without being good readers, good spellers, or good penmen, and knowing nothing of the principles of elementary sounds. They perhaps have a little knowledge of technical grammar, but have had almost no practice in the expression of their own thoughts. Our drill in English must cover all these points, together with the principles of and practice in capitalization, punctuation, and the analysis of sentences, which latter of itself is quite a field for study. Only four or five short months are allowed to accomplish this; hence the problem of how best to employ the time. Nearly half the time was occupied in the effort to lead the students to express their own thoughts about pictures, objects, and abstract themes, in a presentable shape; and I may say, in many cases, the work was attended with very gratifying success.

Our course in English structure embraces a knowledge of the origin of the language, its growth, its derivation from other languages, the formation of words from roots with their various prefixes and suffixes, using roots from the Saxon, Latin and Greek languages, and showing how our words are built from these various sources. It also includes drill in the structure of sentences. The object has been to introduce the pupil to many words in common use with which he was not before familiar, to give him a clearer perception of the meaning of those words with which he was somewhat acquainted, and to give him variety, clearness and facility in expressing his thoughts. This work has been accompanied by regular practice in the expression of thought upon paper, and a criticism of the same. A portion of the time in these classes has also been spent upon declamation.

The best course to be pursued in the study of arithmetic is far more plainly marked than it is in the study of English. Every student needs skill in the use of the simple rules. He needs perfect familiarity in handling fractional numbers, both common and decimal; and, as long as we have not the metric system, he needs acquaintance with our varying scales of denominate numbers. He must thoroughly understand the principles of percentage, as they apply to so many of the business transactions of common life; and he needs to develop his powers of thought in the application of all these principles. But those parts of the arithmetic which may be classed as ornamental, or which are put in simply for the purpose of showing what may be done with numbers, may wisely be omitted from the course, in such an institution as this. The effort has been to make the study as strictly practical as possible, by applying the principles to tangible objects, which may be handled and measured by the class. Nearly as much work has been done outside the text-book as in it.

The class in algebra, last fall, was unusually large, from the fact that no advanced arithmetic class was organized that term, and those more advanced than the drill class were placed in algebra. The chief importance of this study, aside from familiarity with some of its formulas that are used in the higher mathematics, is the discipline it gives to the mental powers. For this purpose, I consider it very valuable. The brief time devoted to the study of it in our course seems very unsatisfactory, if it is to be taught as a science; but, with our present curriculum, I am not sure that a longer time can wisely be given.

The class in book-keeping last year was also quite large, as it embraced those who were in algebra the previous term, as well as the regular advanced arithmetic class, and some others who had not studied it before. This is a practical study, and considerable time was spent upon those forms of book-keeping which are best adapted to farmers, mechanics, or others who have comparatively few business transactions to record. Practice was also given in the full form of single-entry, and two or three sets of examples in regular double-entry. It is proposed the coming year to supplement the course in book-keeping in the advanced class by a course in commercial law, thus giving the students an acquaintance with legal forms and regulations in reference to common business transactions.

In reference to United States history, I have but little to add to the substance of my last report. The class is now open to both sexes, which was not formerly the case. This is as it should be, as the study is just as necessary for young men as it is for ladies. A portion of the class was obliged to stop near the middle of the term, to take drawing. The remainder continued through the term, finishing the study, and also spending three or four weeks upon the Constitution. This is quite desirable, and I think a full term should be given to such study.

In addition to the above classes, I taught last year, as heretofore, classes in vocal music, from 2 to 3 P. M. The number in both these classes was about fifty. By direction of the Board, I charged, the last term, a fee of $1.50 to each student. The pupils made commendable progress, so that we were able, by the assistance of Professors Hofer and Walters, as on some previous occasions, to furnish acceptable music for the commencement exercises,—the reporter for the *Nationalist* remarking that it was the best music that had been supplied for the occasion.

In conclusion, allow me to say that we congratulate ourselves and the Board on now having neat, comfortable, and commodious rooms in which to hold our recitations. We ought and intend to do better in the future than ever before, and look forward with bright anticipations to the grand future of the Kansas State Agricultural College.

Respectfully submitted.
J. E. PLATT,
Prof. of Elem'y English and Mathematics.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—Permit me to submit the following report of the Department of Elementary English and Mathematics, for the year ending June 30, 1880.

The following branches have been taught in this department,—English, arithmetic, book-keeping, and U. S. history. On account of the large number of students in these classes during the fall and winter term, I was unable to do all the work of the department; and I wish to acknowledge the assistance of Superintendent Graham in arithmetic, during the fall term, and that of Prof. Walters in arithmetic and Prof. Ward in English, during the winter term.

The work of the class in English has included a short course in penmanship, exercises in spelling, elementary sounds, reading, declamation, the construction and analysis of sentences (simple, complex and compound), the modifications and relations of the different parts of speech, the correction of false constructions of sentences, capitalization, punctuation, and written expression of original thought, including letter-writing. Nearly one-third of the whole time in this class has been devoted to this latter exercise, with a criticism of the papers by the class and by myself. It is believed that the ability to express one's thoughts upon a subject within his grasp, easily, clearly, and forcibly, in accordance with established usage, and in a legible handwriting, is of more value than any amount of knowledge of the science of language, without this ability. If we add to this the ability to utter these thoughts, written or unwritten, in a manner to interest and move the feelings and opinions of an audience, it is certainly a great accomplishment. The field of elementary English is a broad one, and in the time allotted to it, some parts must be left with shallow cultivation; but I have the satisfaction of believing that, in the case of each member of the class, genuine progress has been made.

In teaching arithmetic, it has been my object to impart a knowledge of the science of manipulating numbers, as well as the art. Much time has necessarily been spent in endeavoring to secure skill in the use of the four fundamental rules of arithmetic. If all our students came to us with the ability to use these rules with accuracy and a reasonable degree of rapidity, nearly half of our work would be accomplished. If the mind and time of the student are occupied in the slow performance of the mechanical part of the work, with frequent errors which must be corrected, he is unable to attend to the scientific part of the rules and principles. I fully believe, that if the entire first term of study in this branch were devoted to such

a mental drill as was once given in Colburn's, or later in Robinson's, mental work, it would be time well occupied. I have spent most time upon those principles which I consider most important for the industrial pursuits, and have endeavored to bring the class so in contact with real things, as to enable them to apply their knowledge to real transactions.

The classes in book-keeping have been made acquainted with the simple forms of single entry, which is best adapted to the use of farmers or mechanics, or others who have but a limited number of business transactions to record; and it has been my object to impress upon the minds of the class the importance of keeping a record of these transactions in some systematic form. They have also been drilled in several sets of double-entry book-keeping. Each student has purchased a set of blank books. A list of articles, with their prices, has been taken from the business houses in Manhattan, also a list of real names from their ledgers: from these I have made a set of imaginary business transactions, which the students have recorded in their day-books, journals, and ledgers. Many sets of books have thus been written, which, for accuracy and neatness, would make a respectable appearance in any mercantile establishment.

In teaching United States history, it has been my object to lay a foundation for future reading and study of history, to note the relation between causes and their effects, to cumber the mind with only a few periodic dates, but to have these so thoroughly learned as to be always remembered in connection with the prominent events in our country's history. I have endeavored to lead the pupils to notice the germs and the growth of our political institutions, and to make them acquainted with the present operations of our civil government, through the salient points in the Constitution.

The numbers reciting in the different classes during the year, by terms, not including those classes taught by the Professors who have assisted in my department, is as follows: —

Studies.	*No. enrolled in class.....*	*No. exam'd at close of term.....*
FALL TERM.		
English	58	47
Arithmetic "A"	54	37
Arithmetic "B"	36	31
WINTER TERM.		
English	40	29
Arithmetic	44	40
Book-keeping	62	43
History	54	37
SPRING TERM.		
English	56	45
Book-keeping	48	44
History	42	28

The whole number of different students reciting to me in each study during the entire year is as follows: English, 91; arithmetic, 106; book-keeping, 110; history, 96.

I have continued to teach vocal music, as heretofore, in two divisions, meeting each division twice a week. There were enrolled in these classes — fall term, 44; winter term, 61; spring term, 45.

Respectfully submitted.

J. E. PLATT,

Prof. of Elem'y English and Mathematics.

THE INDUSTRIALIST.

SATURDAY, MARCH 12, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

LOOK OUT FOR THE NEXT NUMBER!

One to be Filed Away for Reference.

HOW AND WHAT TO SOW AND PLANT.

The next number of the INDUSTRIALIST will contain practical, comprehensive articles on the "tame grasses," "seed corn," tree-planting, College experiments, and other subjects of great immediate interest to the farmers of Kansas. We are moved to this step by the numerous enquiries concerning these subjects, which pour in upon us from different parts of this and other States. This number, we believe, will be practical, and very useful to cultivators particularly. A large edition will be issued; and, as long as it lasts, a 3-cent stamp will buy one copy. Address A. A. Stewart, Manhattan.

Fish Farming.

With the introduction of the German carp by Prof. Baird, a few years ago, it seems certain that a new and very valuable class of live stock has been brought within reach of American farmers. Already the possibilities of carp-raising are pretty well understood. In some sections of the country, carp are as regularly and successfully grown as pigs or chickens. In New Jersey and sections of New England, this business is attaining very great proportions: a large and constantly increasing number of farmers are flooding portions of their farms; and these assert that, acre for acre, a larger amount of more valuable meat can be obtained from the carp than from any other class of live stock.

The carp is wonderfully prolific, a single female producing from 5,000 to 10,000 young. They are as good foragers as Berkshire pigs, supporting themselves very easily from the vegetable growth of the pond; but they may be fattened as pigs are by a liberal feeding of boiled corn, corn meal, or other similar grains. Single specimens at four years old have been brought to the weight of 10 to 15 pounds.

Fish Commissioner Long, of this State, is enthusiastic in his praise of the German carp for those Kansas farmers who have the disposition and ability to give them proper attention. There are few farmers in Kansas who could not furnish a quarter or half an acre of ground, which might be devoted to raising these valuable fishes; and there are in every township scores of "draws" and "sloughs," now quite worthless, which might, as fish ponds, be made the most pleasant and profitable parts of the farm.—*Prof. Shelton.*

A Good Blackboard.

About the most necessary auxiliary to teaching is a good blackboard,— black and smooth, with enough grit to take chalk easily, and hard enough to permit erasing. The following recipe, which has been used at this Institution for some time, is the *ne plus ultra* of any mixture that will produce these qualities, cheaply, upon any surface: Dissolve one-half pound of shellac in one gallon of alcohol; and, after the solution is complete, add three papers of lampblack. It will take a day or two to dissolve the shellac. Apply this mixture, with a somewhat stiff paint-brush, to the surface — wall, board, or paper — twice, and the blackboard is ready for use. The mixture dries very rapidly, permitting the application of the second coating immediately after the first. If the surface consists of soft plaster Paris, or of a badly damaged old board, putty up all holes and cracks with plaster, cover it with a layer of very thin but solid wall-paper, and apply the mixture to this. The wall-paper may be stuck on with cornstarch paste, as in paper hanging, and should dry well before the mixture is applied. If the mixture is used upon the printed wall-paper surface, the board needs some rubbing with a rough cloth when finished, to polish it. Never add slate-powder, or pulverized pumice-stone. A gallon of this slating will be sufficient to go twice over twenty-five yards of surface or more. As the mixture evaporates very rapidly, no more should be mixed than necessary for immediate use.

The recipe given here is the result of many experiments. It may not be a novelty to many, as its ingredients are found in any paint shop; but we know that it will give a better, cheaper and more durable surface than any patent slating that we have tried, — a full dozen, to say the least. We hope it will save many district boards from patent-slating bores, and many teachers from trouble with miserable blackboards.—*Prof. Walters.*

Sowing Grass Seed.

Mr. Forcha, who purchased 5,000 acres of land near Fairfield station, has now six men engaged in sowing grass seeds upon it, at an expense of about $2,000. He is sowing five hundred bushels of Kentucky blue-grass seed, fifty bushels of timothy seed, and fifty bushels of clover seed, upon the open prairie; and is desirous that the neighbors' cattle pasture it down as much as possible, as he expects no returns from it under five years, knowing that it takes that length of time for blue-grass to make a good sod. Mr. Forcha is a man of means and energy, and knows what he is about.—*Alma News.*

We are familiar with at least a half-dozen ventures in seeding Kansas prairie, similar to the one detailed above: in one case, a whole car-load of Kentucky blue-grass seed was scattered over the prairie; but the result in all cases was a total failure to secure even a partial stand of grass. In the case where the car-load of seed was sown, we found a few scattering bunches of blue-grass around the home buildings, three years after the seed had been sowed; but a much better result might have been obtained by the judicious use of a single bushel of seed.

In central and western Kansas, the growth of Kentucky blue-grass and, for that matter, tame grasses of all kinds, have not yet passed the experimental stage; and for any one to scatter grass seeds promiscuously over the prairie, is to court disaster. We have no hesitation in saying that this gentleman has fewer than one chance in a hundred of being successful in his undertaking. As to sowing clover and timothy seed, we should have greater hopes of success from sowing wheat and barley upon the unbroken prairie, than from either clover or timothy.

It is worth while to remember that the fact that a given plan of farming is in the East successful, furnishes just as good proof that the same plan will be a failure in Kansas as that it will be a success. No one has a higher appreciation of the value of "means and energy" in farming than do we; but Kansas farming requires something more, as scores of "big wheat-growers" will sorrowfully testify. Kansas farming will, for many years to come, involve a deal of groping in the dark and "feeling one's way;" and this style of farming is done with greater assurance of success and infinitely less cost upon an acre of ground than upon five thousand.—*Prof. Shelton.*

Our Exchanges.

Farmers have commenced sowing wheat. An effort should be made by our business men to supply the demand for seed.—*Gaylord Herald.*

When a young man's salary will not permit him to wear a thirty-cent cameo head of some old pagan god or other at the focus of his full-front-save-wash-bill neck-tie, then the times may be characterized as impenetrably dense.—*Wichita Republican.*

The building boom has struck Clay Center in earnest this time, and no less than $50,000 will be expended in business houses on the south side of the block on Court street, just north of the public square, during the next five months.—*Clay Center Dispatch.*

A railroad hospital is to be established at Ellsworth, Kansas, on the Kansas Pacific division of the Union Pacific Railroad. The company supplies the building, surgeons, etc.; and an assessment of fifty cents around each month is made upon the employes.—*Salina Herald.*

Diphtheria is prevailing to such an extent in Lawrence that the *Journal* calls upon the city council to enact an ordinance forbidding public funerals of persons who die with the disease; and also one forbidding the attendance at the city schools of all children who have sore throats, whether it be diphtheria or not, in order to save the lives of many and prevent the spread of the disease.

We hear very flattering reports from the farmers in regard to wheat; that it is alive, and, with the first dawn of spring, will shoot forth. And now that winter seems to have spent its force, we have every reason to expect a large fruit crop, although some of the croakers, with which every country is more or less cursed, have long since wailed forth their prognostications of failure.—*Newton Republican.*

Large numbers of hogs have perished, in different parts of the country, during the heavy snow-storms of the past two weeks. We are informed that N. Lockerman lost ninety-five head, J. L. Coffman seventy head, while many other farmers have suffered loss to a smaller extent. The mortality among the swine, in most cases, resulted from the hogs huddling together in such dense masses as to either smother, or be trampled to death.—*Emporia News.*

Ed Hutchins shipped another car-load of mules to Kansas City on Friday of last week. This makes five car-loads — ninety-five head — in the last sixty days, distributing about $10,000 among our farmers for these long-eared but useful animals. Mr. Hutchins informs us that for good mules there is always a ready demand at good prices. We suggest to our farmers that it is just as easy to raise a mule that is worth a hundred dollars as it is a scrub pony that is slow sale at a quarter of the money.—*Valley Falls New Era.*

It is estimated that there are at least four thousand dead cattle lying scattered along the railroad between Dodge City and the Colorado State line; and all along the Arkansas River there are hundreds of cattle lying dead. During the recent storm, they drifted from the north; and, as they could go no further and there was nothing to eat, they laid down and died. The weather was much more severe north and west than it was here in Barbour county. Until spring, it will be impossible to estimate the loss the stockmen of western Kansas have sustained. —*Wellington Wellingtonian.*

Educational Gossip.

The new school-house at Washington is to be made of stone from Irving.

Gould College, at Harlan, Smith county, seems to have promising prospects.

There are 5,242 school-houses in Kansas. No other one million of people on the earth has so many.

Prof. Ed Walters, of the Madison public schools, is attracting some attention among scientific men by his recent discovery of rare geological specimens in that locality.

County Superintendent Chidester, of Labette county, appointed March 18th as a "Public-School Arbor Day" for that county, to be observed by the planting of suitable trees for shade and ornament around school-houses and school-lots.

The State of New Jersey offers $20 to every free public school in the State, with which to start a library, upon condition that the district raises as much more. And $10 is added yearly upon the same condition. A similar law was proposed in Kansas a few years ago, but failed to pass.

Kansas has a second woman lawyer; Mrs. Kellogg, of Emporia, being the first. Number two is Miss Flora Torrey Wagstaff, of Emporia. Miss Wagstaff is a handsome blonde, very lady-like and refined in manner, a bright scholar, and highly accomplished in music and painting. She has read law about two years, and attended the St. Louis Law School for one year.—*Champion.*

An office-boy to a Kinsley "root doctor" relates that he was once sent into the woods on the Cimmaron to get some of the inner bark of the butternut tree. "Tom," said the doctor, "I want you to scrape this bark downward. It is for a cathartic. Don't scrape it upward, or it will be an emetic. And whatever you do, Thomas, don't scrape it both ways. If you do, nobody on earth can tell how it will act."—*Dodge City Times.*

We have often spoken of the energy of the Catholics of Kansas in building up educational institutions. The following statistics show that they are just as energetic elsewhere in this country: "According to the Catholic Directory for 1881, there are in the United States 12 archbishops, with 48 suffragans, 8 vicarates apostolic. The number of priests returned is 6,402; and there are 1,170 ecclesiastical students preparing for the priesthood. The churches in the country have increased to 5,856, and the population is estimated at 6,377,330. The progress of parochial schools is very rapid. In 2,384 schools, there are 423,383 children.

THE INDUSTRIALIST.

SATURDAY, MARCH 12, 1881.

President Fairchild went to Topeka yesterday to attend a meeting of the State Board of Education.

The Farm Department wishes to engage a single man to work by the month, during the coming summer.

So far this winter, the College has purchased, and it will certainly use, over twice as much coal as was consumed during the winter of 1879-80.

The large number of enquiries about the "tame grasses," alfalfa culture, etc., received at the College, shows the deep interest these subjects are awakening in the minds of our farmers.

The WaKeeney *Leader* credits the INDUSTRIALIST with the article on "Crossing Wheat," which we recently published. The article in question was copied from the Topeka *Capital*, and due credit was given.

The only earthly objection that we can offer to the present really delightful weather, is that it spoils several brilliant locals referring to the indefinite postponement of spring, winter lapping over, etc.

The regular public Friday afternoon exercises yesterday consisted of original orations by the first division of the Senior Class. The speakers were Miss D. Mason, and Messrs. U. G. Houston, W. J. Jeffery, and W. J. Lightfoot.

Mr. E. C. Dyche, of Boonesboro, Arkansas, called yesterday. Mr. Dyche is an enthusiastic advocate of the culture of Bermuda grass, which he is confident can be successfully grown in Kansas. We are promised a good start for the College farm, with this grass.

President Fairchild and Prof. Shelton desire to express their appreciation of the many courtesies shown them by the good people of Abilene, during their recent visit to that thriving town. In particular, they are indebted to Hon. T. C. Henry and V. P. Wilson for many kind attentions.

In reply to numerous enquiries received from time to time, we wish to say that the College has no grass seeds for sale, or, for that matter, seeds of any kind. We shall have young Berkshires, of the best families, for sale during the coming season, and good Short-horn cattle of both sexes.

Major Coburn's excellent address on "Dogs in their Relation to Sheep Husbandry," delivered at the late Breeders' Institute, was published in full in the Chicago *Times*, *Prairie Farmer*, and *Kansas Farmer*;—a deserved compliment. We regret that our own limited space prevents us from publishing this vigorous paper.

The *Nationalist* came out last week with a bran new broadcloth suit, diamond studs, a silk hat, and patent-leather boots, with all the *et cætera* to match. The *Nationalist* is known all over the State as one of the ablest, soundest newspapers published in the West; and no one will rejoice more than we at these evidences of Bro. Griffin's prosperity.

We have heard much in praise of Rice corn, as an article of human food, from the newspapers of the western portion of the State; but have always taken their statements with several grains of allowance, believing that necessity made the morsel sweet. We have lately tried Rice corn flour,—kindly sent us by Prof. Hofer,—reduced to the condition of batter cakes, and stand ready to pronounce them nearly or quite equal to the best buckwheat cakes, which they closely resemble.

The *Educationist* for March comes out with a hurrah for tree-planting that ought to awaken the echoes in every little, dirty, parched and barren school-yard in the State. The March number, in addition to a valuable article on tree culture, by John Robson, of Dickinson county, and much valuable educational matter, contains, we notice, an article on "The Skilled Observer," by President Fairchild, and another on "Our Neglected Studies," by S. C. Mason, an old student of the College.

Of 195 students now attending this Institution, 47 live at home, 48 board, and just 100 board themselves, or, in students' parlance, "bach" it. Meanwhile, a boarding hall near the College, which has furnished fair board at $1.50 per week, is without patrons. The average Kansas youth, whether he be as rich as Jay Gould or poor as a country schoolteacher, loves the sweet privilege of cooking his own flap-jacks and washing his own dishes,—usually done to-morrow,—with no boarding-house keeper to let or hinder.

The Farmers' Institute held in Abilene, on Friday and Saturday of last week, was a well-attended, enthusiastic meeting of farmers, although bad roads and a railroad-bond election in the south part of the county were against it. The Institute was addressed by President Fairchild, on Saturday evening, and by Prof. Shelton, on the afternoon of the same day. The farmers of Dickinson county have determined to place the Institute upon a permanent basis; and we saw enough of the farmers and people of Abilene to satisfy us that this Institute will attain to great proportions.

Vol. IV. of the American Berkshire Record is received. The volume before us is uniform, in quality of paper, style, and binding, with the previous volumes of this work, which is equivalent to saying that it is a neat and substantially bound book. The number of pedigrees recorded in this volume is 1,155, somewhat less than the number recorded in Vol. III. We notice that the pedigrees of 63 Kansas Berkshires are included in the work. Our breeders ought to be much more largely represented. The time is near at hand when Berkshires, like Short-horns, must have recorded pedigrees. Phil M. Springer, Springfield, Ill., is the efficient Secretary of the Association and the editor of the work.

TO BUILDERS.

Sealed proposals for the erection of the central structure of the main building of the Kansas State Agricultural College, will be received by the Board of Regents until 7 P. M. of April 13th, 1881, at the office of the Secretary, in Manhattan. Plans and specifications can be seen at the same office, and at the office of E. T. Carr, architect, Topeka, Kansas, after March 25th. Separate bids are desired upon stone-work, frame and wood-work, plastering, and painting, as well as upon the structure complete. All bids must be accompanied by guarantee of responsibility; and the right to reject any or all bids is reserved.

GEO. T. FAIRCHILD, *Secretary of Board.*

State Agricultural College, Manhattan, Kansas, March 9th, 1881.

The Riley County Sketch-Book, published by the *Nationalist*, Manhattan, Kansas, is received. The Sketch-Book is a volume of 140 pages, in size and general appearance not unlike *Harper's Magazine*. It contains well-written chapters on the State of Kansas, Riley county,—its soil, climate, farms, men and things, business houses, etc.; and is replete with valuable, because reliable, information about Kansas in general and Riley county in particular. The Sketch-Book is far ahead of anything of the kind that we have ever before seen, and is eminently creditable to the enterprise of the *Nationalist*. The INDUSTRIALIST goes to a large number of persons outside of Kansas, who frequently write us for information about the State and its people: to these, one and all, we say, send five 3-cent stamps to the "*Nationalist*, Manhattan, Kansas," and get a copy of the Sketch-Book.

SOCIETY HALL, March 11, 1881.

Alpha Beta Society met at the usual hour, and held a very interesting session. Debate was decided by a unanimous vote in favor of the negative. Extemporaneous speaking was indulged in with more than ordinary interest. The Misses Coburn and Mr. Lund created a good deal of merriment by their new departure in declamations. The other members on duty acquitted themselves creditably. The picture committee did not report as usual, but wanted to resign. Considerable parliamentary sparring followed the motion to discharge the music committee. It was finally decided to retain the "beautiful songsters, who fill our souls with joy." It was also decided that the Society should have an organ. A committee was appointed to solicit subscriptions for that purpose. Programme for next meeting: *Gleaner* by G. E. Hopper and Miss Lightfoot; debate, Mr. Clothier and Miss McElroy, Mr. Pringle and Mr. Boles. An interesting time to be expected. ST. CHARLES.

SOCIETY HALL, March 5th, 1881.

Society opened at usual hour, with good attendance. After opening exercises, the order of debate was introduced, which was conducted with much spirit. Decision finally given to the effect "that religion has done more towards civilization than has education." Extemporaneous speaking came next on programme, after which a motion prevailed to take a short recess. Under order of new business, a vote of thanks was given by the Society to Prof. Walters, for the presentation of his picture of Washington to Society Hall. Under unfinished business, the committee on programme for special session at the end of the term, reported favorably, and presented a programme for consideration by the Society. Report was accepted, and programme adopted. Question for debate next session, "*Resolved*, That the canal across the Isthmus will not be so convenient as the railway." Affirmative, M. T. Ward and H. G. Horning; negative, G. L. Horning and M. A. Reeve. *Reporter* in two weeks by W. A. Corey. CALL.

THE SPRING TERM.

The winter term of twelve weeks closes with examinations on Friday, March 25th. The spring term begins on Monday, March 28th, and closes with commencement exercises, on Wednesday, June 8th. Students already in the regular course find this term quite essential to their successful progress. Those about to enter will need better preparation than was required for the previous terms of the year. Examination for entering includes Reading, Spelling, Writing, Geography, Arithmetic, and the elements of English Grammar. Classes will recite on the first day of the term, and new students arrange to begin, if possible, with the classes.

The following branches will be taught in classes arranged with reference to general advancement of students:—

First Year.—Algebra. English Composition. Botany, with Drawing. English Drill. U. S. History. Book-keeping.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—U. S. Constitution. Political Economy. Agricultural Chemistry.

Students are admitted to such studies as they are able to pursue to advantage, though advised to follow essentially the regular course, so far as they can. Drawing, music, and the various industrial arts named elsewhere, are so arranged as to accommodate students of all grades of advancement.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us. Its meetings are held on the first Friday evening of each month.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil, climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the deve opment of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain.—observing and comparing seeds, eaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, MARCH 19, 1881. No. 31.

COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M.
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

THE TAME GRASSES IN KANSAS.

When, Where, and How to Sow them, with Some Suggestions as to their Management.

To those familiar only with the more general and obvious facts of Kansas agriculture, a discussion of the tame grasses may seem superfluous at this stage of our agricultural progress. It is true that a vast proportion of all the untilled lands of the State are thoroughly occupied by a luxuriant growth of the sweetest and most nutritious wild grasses. Nothing shows the great value of these grasses better than the familiar fact, that they have for countless ages been the sole support of the vast herds of buffaloes and antelopes which originally occupied our prairies; and to-day the great number of domestic herbivora, which contribute so largely to the wealth and power of Kansas, draw their chief support from the same source.

WE NEED THE TAME GRASSES,

then, not because the wild ones are not nutritious and naturally abundant, but because (1) of their inability to furnish proper field pasturage, and (2) they cannot be made to take any part in the general system of alternate husbandry, towards which our agriculture is rapidly tending. Our wild grasses, valuable as they are, notoriously cannot endure close cropping. Even under moderate pasturing, they rapidly fail, giving place to coarse and worthless weeds. Again, these wild grasses are among the very latest of our plants to appear in the spring; and the slightest touch of frost in the fall, robs them of all nutritive qualities. It is no exaggeration to say that the tame grasses will reduce our present feeding season one-third. As it now is, our "feeding season" is nearly or quite as long as that of New England.

Careful feeders assure us, that in this section, cattle, after the middle of September, must receive feed other than that furnished by the "range," or they lose flesh rapidly; and in the spring, during the past seven years at least, the same "range" has rarely furnished good feed before May 1st. It is worthy of remark, that the orchard-grass, alfalfa, and rye-grass grown upon the College farm during this same time, has furnished good feed in the fall as late as December; and, in the spring, these same grasses are at least three weeks in advance of the wild ones. Need we offer

A STRONGER ARGUMENT

in favor of the more general introduction of the tame grasses? But, in reality, we need the tame grasses for better reasons than any yet named. The need of renovating pasturage is already strongly felt in the older-settled portions of the State. "How can we improve the condition of our farms?" is a question in Kansas agriculture which arises with greater force and frequency each year. Surely, with the present low price of all farm lands and products, this cannot be done by the application of barn-yard manure or commercial fertilizers! This can only be done *profitably* by "seeding down" the land and devoting it to pasture for a greater or less number of years; thus accumulating in the land the store of plant food needed for the successful growth of the cereal grains. The wild grasses cannot be seeded and consequently have no place in "alternate husbandry." The tame grasses, then, are indispensable to any improved system of farming which looks to maintaining the fertility of the soil, while exacting the utmost from it. In no way can our worn soils be replenished so cheaply as by turning under with the plow the great accumulation of vegetable mold, roots, and stalks which constitute the turf of an old pasture field.

In writing out these

OBSERVATIONS AND EXPERIENCES,

the writer wishes to say that his experience with this question in Kansas, has not gone much beyond the boundaries of the Agricultural College farm. Account should be taken of the fact that Kansas embraces such a vast variety of soils and climatic and meteorological conditions, that the details of the experiences of one section cannot be safely applied to all others. In the eastern portion of the State, the question of the culture of the tame grasses seems to be decisively settled: in the central and western sections, on the other hand, the question, for various reasons, is an open one. We shall, therefore, in this paper, while writing from the standpoint of our experience on the College farm, aim to make such suggestions therefrom as will be especially serviceable in the newer-settled parts of the State. If these views run counter to the experiences of any one, he has a plain duty to perform in making the facts known to those who will be benefited thereby.

PRACTICAL, RATHER THAN SCIENTIFIC.

The writer does not feel it necessary, in a paper which treats its subject as this does, in its practical relations, to adhere to systematic names and classifications. When, therefore, under the head of "grasses" we speak, however illogically, of clovers and alfalfa, we feel certain that our meaning will be best understood by those for whom this paper has been prepared.

WHAT GRASSES SHALL BE GROWN?

So far as practical agriculture is concerned, all grasses may be classified into two principal groups, according as they are valuable for pasture or mowing. Occasionally, as in alfalfa and the clovers generally, sorts may be found which are equally good for both purposes; but, generally, those sorts which are valuable for grazing, have but little value when brought under the scythe.

For pasture, I have no hesitation in recommending the following sorts, placing them in the order of their importance: orchard-grass, alfalfa, red clover, perennial rye-grass (English blue-grass). For mowing purposes, our experience has shown, very steadily, that alfalfa, red clover, perennial rye-grass, and timothy are the best. So far as the matter of withstanding the effects of drouth is concerned, these sorts will rank, with us, in about the following order: alfalfa, orchard-grass, perennial rye-grass, red clover, Kentucky blue-grass, and timothy.

CHARACTER OF THE SOIL, AND ITS PREPARATION.

In our experience, the best results have been obtained with all the sorts of tame grasses upon a fertile clay loam, resting on a permeable clay subsoil. But, let it be remembered, land can not be too rich or too highly manured for the grasses. Indeed, we have found that not only are the largest yields obtained upon such fertile lands, but the effect of insect depredations is greatly lessened. Of course, comparatively poor lands, in Kansas as elsewhere, will grow grass; but poor lands produce poor crops everywhere. Better far, commence the growth of the tame species of grass before the land has become impoverished by injudicious cropping.

But, whatever may be the character of the soil, prepare the land as well and thoroughly, by plowing and harrowing, as for any grain crop. This is a rule with scarcely an exception; and its violation in various ways explains a large proportion of the failures that have attended the attempted cultivation of tame grasses in Kansas. The question is asked us many times every year, Why may I not scatter the seed upon the sod, as is often successfully done in the East? This may be done; but the practice, so far as our observation has gone, has resulted in almost uniform failure. Where the prairie sod has been largely destroyed by the tramping of cattle, we have known blue-grass to succeed partially by this method; but, even in this case, a better sod would have been obtained in less time by thoroughly subduing the land, by two or three years of cropping, before applying the grass seed.

DO NOT SEED WITH ANOTHER CROP.

Oats are often recommended as an excellent crop with which to sow grass seed. The argument is, that the oats will shade and protect the young grass. But grass does not need shade, when sown in proper season: it needs the sun; and, especially, it needs moisture, and this the oat plants are continually taking from the soil, thus robbing the young grass plants from the start. I am aware that, upon favorable seasons, considerable success is often obtained by seeding the grasses with another crop. But, even upon these favorable seasons, a better and more vigorous start will be obtained without the rivalry of vigorous grains; and, upon dry seasons, a failure of the grass is almost certain, when seeded with a grain crop.

THE TIME TO SOW

grass seed is, we believe, without any exception, in the spring; and recent experiments show that this work should not be undertaken too early in the season. In the spring of 1880, a field seeded early in April came to nothing, the violent dry winds

that followed the sowing completely sweeping the seed away. Seed sowed after the spring rains have fairly set in, has never failed since 1874 to give a good stand of grass. In a few instances, and where the winter following has proved warm and open, we have had good success with timothy and clover sowed in the fall; but the result of sowing orchard-grass, alfalfa, and blue-grass in the fall, has been almost invariably disastrous. With all kinds of grasses, we have obtained the best results when the seeding has been done in the spring. Our experience with grass seeds sown in the fall has been this: they germinate readily, even more quickly than in the spring, but, as the native vegetation fails from the action of frosts, the common grasshoppers collect upon the young grass, doing it serious damage; what remains suffers seriously, and is often quite destroyed, by the action of the winter frosts and violent winds of early spring. On the other hand, when the seeding is done very late in the spring, the young and tender plants are consumed by the sun as fast as they appear above the ground. Seed sown any time during the month of April, will rarely fail to germinate and make a vigorous growth. However, we cannot advise seeding, as we have before said, until the warm spring rains have set in. We have sown both alfalfa and orchard-grass during the early part of May, with excellent results.

WHERE TO PURCHASE SEEDS.

One of the commonest causes of failures in grass seeding in Kansas, has arisen from the worthless character of the seed furnished by dealers. As a rule, the trade in grass seeds is not a large one as yet, anywhere in Kansas; and seeds which are not sold any one season, are carried to the next. In this way, seeds which were originally good are badly damaged, or their vitality is totally destroyed by being kept year after year in damp cellars and mouldy warehouses. The worst failure that we have ever made in grass seeding, resulted from the use of such seeds as we have described. Send directly to headquarters for grass seed,—to the large dealers in Chicago or St. Louis: from these you will get better seeds usually for much less money than they can be purchased of local dealers.

ALFALFA, OR LUCERNE, (*Medicago sativa*),

has been cultivated as a forage crop from the earliest period of history. It was well known to the ancient Romans; and, time out of mind, it has been a favorite fodder-plant with the inhabitants of central and southern Europe. The early settlers of the South American states—notably Chili—carried the seeds of this plant to their new homes, where it has grown with success ever since. From Chili, its cultivation has rapidly extended over California and our western coast, from whence most of our knowledge of it has been derived. The effect of the dry climates of South America and California upon the habit of the plant, has been quite remarkable. Alfalfa is more hardy, takes a more luxuriant growth, and endures drouth much better than its near relative, lucerne. For this reason, it is clearly to the interest of every grower of alfalfa to use only seed of California origin.

In regard to the value of alfalfa for Kansas, we have no hesitation in saying that, all things considered, it is our most valuable clover, especially for the western and southwestern sections of the State. Nevertheless, a large proportion of those who undertake to grow alfalfa will fail, in the first attempt. Let us emphasize two or three of the matters about which most of these failures cluster. Alfalfa must have old, rich, and well-drained land to begin with; and the freer this is from weeds, the better. Prepare the ground thoroughly, by plowing and harrowing. Sow not less than twenty pounds of seed per acre, and sow this about the middle of April: harrow in lightly, following with the roller, if possible. Do not be discouraged if the plants make a feeble growth during the first season, as they always do. Do not pasture or mow during this first and critical season. The mower should occasionally be run over the ground, high enough to miss the alfalfa and cut off the tops of the weeds. After this first season, alfalfa will take care of itself and all the weeds within its reach. Alfalfa is perennial, perhaps eternal: at all events it will outlive the "oldest inhabitant," if it gets good treatment. The dangers which threaten it most are the common mole, which frequently burrows among its roots doing great damage, and the very severe cropping of cattle and swine during the summer and late fall. This last difficulty can and should be guarded against. Alfalfa makes the most pasturage for neat stock, and the best "hog pastures." It cuts the most hay: we have cut three and even four large crops from the same ground in one season.

ORCHARD-GRASS (*Dactylis glomerata*)

has proved one of the very best and safest of all the pasture grasses that we have tried. It is but an indifferent hay plant, yielding a light crop of woody, fibrous fodder. Upon very rich land, large crops of hay are claimed to have been secured; but this result we have never obtained, and the hay has proved with us scarcely equal to that cut from the prairie. But, in grazing, its valuable qualities soon become apparent to the farmer. We feel confident that it will yield fully twice the feed that can be obtained from the same area of blue-grass or timothy; and, in nutritive qualities, it is certainly greatly superior to blue-grass. Orchard-grass is one of the earliest grasses to start in the spring, and the last to succumb to frost in the fall. By giving it a good start in the fall, it will furnish good pasture far into winter. It is consumed with great relish by stock of all kinds, especially if the grass has been cropped short. It seems to do equally as well upon heavy clay and sandy soils; and any rich and well-drained soil seems suited to it. It germinates about as easily as oats; and, with good seed, no difficulty is experienced in getting a "stand" that will endure moderate cropping the first fall after seeding. As might be inferred from its common name, it does best when moderately shaded, and is admirably suited to orchard culture: yet there are few grasses that will so well endure the prolonged sunshine of our dry seasons. For these reasons, we feel safe in recommending this grass to the farmers of central Kansas, for the purposes of the pasture. It should, however, be remembered that orchard-grass will not make a sod, as blue-grass does. It always grows in bunches or tussocks; and, to counteract this tendency, seed should be sown with a liberal hand. Not less than 1½ bushels of seed should be sown per acre; and two bushels would perhaps be better. We have usually sown a liberal sprinkling of Kentucky blue-grass seed with orchard-grass; but, almost invariably, it has been smothered by the orchard-grass. We have found that red clover does excellently with this grass, and aids in furnishing that variety of food so agreeable to the taste of animals.

Orchard-grass will endure late seeding better, perhaps, than any other sort; but this operation ought not to be delayed much beyond the middle of April.

PERENNIAL RYE-GRASS, OR ENGLISH BLUE-GRASS (*Lolium perenne*).

In the eastern and southeastern part of the State, this old English favorite has given great satisfaction; and its cultivation in these parts is rapidly extending. In some respects, this sort is superior to orchard-grass, as it seems equally adapted for pasturing and mowing. Upon rich soil, it endures close cropping wonderfully: we doubt if it is surpassed in this regard by any other grass. Moreover, the seed grains are large; and a stand is obtained about as easily as with oats. We are inclined to the opinion that this sort is especially valuable for our rich bottom lands, over a large part of the central and eastern portions of the State. But it is worth while to remember that perennial rye-grass yields a woody and comparatively innutritious feed; and it is peculiarly liable to ergot, a fact which our graziers will appreciate. I have frequently noticed this parasite in great abundance upon the rye-grass grown upon the College farm. Sow not less than two bushels of seed per acre, upon land that has been well and thoroughly prepared.

The old-fashioned Eastern favorite, and without doubt the most generally valuable of all clovers and grasses,

RED CLOVER (*Trifolium pratense*),

needs no particular mention here. In 1874 and '75, two exceptionally dry seasons, it failed almost entirely here, giving neither pasture or hay. But, during the favorable seasons which have since prevailed, it has flourished abundantly; and has yielded more—both of hay and pasture—than is generally obtained in the East. We have in one season cut two excellent crops of hay and a crop of seed from the same ground. Red clover in this State has one interesting peculiarity worth mentioning. When land is once seeded, it never "runs out," as is the case in the Eastern States, but thickens and spreads continually by self-seeding. Red clover is worth a trial anywhere in the State, and we are confident will ultimately take a prominent place in the agriculture of the eastern and central portions; but, in very dry seasons, it lacks the "staying" qualities so remarkable in alfalfa. However, while drouth generally reduces the yield of clover, as of all other crops, it will rarely, upon strong clay soil, permanently injure the plants.

KENTUCKY BLUE-GRASS (*Poa pratense*)

can be grown almost anywhere in the now settled portions of the State. We have never failed to secure a good stand, and ultimately a good sod,—even during such very dry seasons as 1875,—when good seed was sown upon well-prepared land and at the proper season, which is early in the spring. However, our experience with the grass,—a very extended one by the way,—has convinced us that, for all useful purposes except lawns, in central and western Kansas, this is one of the most worthless of the tame grasses. It starts early in the season, and for a short time yields a small amount of quite inferior feed; but in May it ripens its seed, the grass becomes brown, dry and fibrous, and in this dormant condition it remains until fall, and often until the following spring. We have invariably found, too, that, in a field containing other sorts, cattle will not touch blue-grass until all these others are consumed, and starvation compels them to resort to the despised blue-grass. Moreover, the dry weather of last season, while it nearly destroyed the blue-grass of one of our fields, did no damage to orchard-grass and clover growing in the same field. On the other hand, in the eastern portions of the State, particularly in the counties bordering the Missouri River, we know from personal observation that blue-grass thrives abundantly, and is a very profitable grass.

We can easily see that this grass possesses great value for a region like Illinois and Kentucky, where winter rains abound, enabling it to make a slow and continuous growth; but the Kansas winter is generally our dryest season, and for this reason we doubt much if this old favorite sort has any place in our agriculture. To obtain a good stand quickly, blue-grass seed should be sown in the early spring; and, in amount, not less than three bushels per acre of ground.

In regard to the old standard Eastern sort,

TIMOTHY,

we have little to say, believing that, over a large portion of the State, it will not prove generally valuable. We have grown large crops, and I have seen many fine stands west of this point; still, it suffers more from drouth than any other sort that we have tried, and it rarely survives the ravages of the grasshopper.

MANY OTHER SORTS

of grasses might appropriately be referred to in a discussion of this character, had we the space at our command. But, in actual fact, the practical farmer, generally, will not cultivate more than two or, at the outside, three species of grasses, and very often a single one will answer his purpose. For these reasons, we have given our observation and experience with a few sorts having, in our judgment, the greatest promise for the newer portions of Kansas. But, even of the sorts mentioned, with the single exception of alfalfa, it must be said that, in

TIMES OF SEVERE DROUTH,

they will fail to yield any crop worth the name. Most of these cannot be seriously injured by an ordinary dry season; and, on the return of rain, they will start with undiminished vigor.

It is worth remembering, too, in conclusion, that our much-despised prairie grasses possess many valuable qualities, which entitle them to the grateful recognition of the husbandman. No known species of grass is better adapted to withstand the effects of drouth; and we suggest that any one possessing a good field of prairie grass, ought to take all pains to secure it against injury, both for its intrinsic value and as a precaution against a possibly dry season.—*Prof. Shelton.*

Entomological Inquiries Answered.

Mr. Wm. Campbell, of Abilene, sends a box with three insects, and askes the name and habits of them. He states that "they were quite numerous in late fall, and are making their appearance again." The insects prove to be three specimens of a plant-bug (*Leptocoris trivittatus* Say) that we have before noticed in these columns. This species, a black insect about half an inch long, marked with three red lines on the throax, belongs to the *Heteroptera*, or bugs, a group possessing, among other characters, a slender beak, or haustellum, by means of which they suck the juice of plants. This bug appears to prefer the juices of several trees, notably the box-elder and green ash. I have found them upon the trunks and branches of these trees, in all stages of growth. They were unusually abundant last fall in this vicinity also; and, during warm days, were to be seen congregated in great numbers in the angles on the sunny side of the stone buildings upon the College grounds, where they had gathered for warmth and shelter. On the approach of winter, they sought the shelter of the crevices in the walls, from which the present sunny weather is drawing them forth. A few

were found in the small greenhouse attached to Horticultural Hall; and there they seemed to attack any plant that was sufficiently juicy. They were found with their beaks inserted in the stems of geraniums, cactuses, lilies, ageratums, and several other kinds of plants. When they appear as numerously as they did last year, they doubtless considerably reduce the vigor of the plants they attack. As they seem to have the habit of congregating upon certain parts of the infested plants, it becomes comparatively easy to destroy them. The insects that are found now will be the parents of the next season's supply; and it is advisable to kill them whenever seen. I have not seen them as abundant before last season, and presume that in ordinary seasons they are not common enough to do noticeable injury.

Mr. Thos. Nixon, of Argyle, sends a small box with specimens found in grapevines. The insect enclosed proves to be the twig borer (*Amphicerus bicaudatus*), a cylindrical brown beetle, about three-eighths of an inch long, that bores the twigs of a variety of trees. It is common in the twigs of the apple and the grape at this season of the year. The mature beetle may be found in the burrows, and is the form that does the mischief. The burrow is begun just above the bud, and proceeds inward to the pith and downward in the stem to the depth of an inch or more. The preparatory stages of this insect are unknown; and the only way of combatting it is to gather and destroy the twigs infested, whenever they are seen. Attention should be paid to this in winter when pruning; and, if the prunings are burned before spring weather arouses the beetles, the larger proportion of them will be destroyed in the twigs.

The box contained, also, a section of grape wood containing the eggs of the cricket (*Œcanthus niveus*). The punctures of this insect appear on the exterior of the grape cane, like a row of pin-holes close together, and extending an inch or two along the stem. The long, slender, yellowish eggs are found at the bottom of these punctures, and each of them will produce, in the spring, a young cricket. These insects are very troublesome in vineyards, by cutting off the stems of the berries, and strewing the ground with the green fruit. In this way and by depositing their eggs in the twigs, they prove a nuisance; and the fruit-grower should lose no opportunity to destroy them and their eggs.

The mature insects measure about an inch long; and the male is yellowish white, with whitish wings, the female being darker. Like other crickets, they have long, slender antennæ and thickened posterior thighs. The young crickets are carnivorous, and, in part, make up for the sins of their ancestors by devouring plant lice and other insects. But they must, on the whole, be classed with injurious insects.—*Prof. Popenoe.*

We this week publish a large edition of the Industrialist; and, without doubt, many copies will pass into the hands of persons not familiar with our College paper, or the Institution which it represents. The Industrialist aims to show faithfully the work of the State Agricultural College from week to week, and particularly the industrial features of the Institution. Herein are reported the experiments made on the farm and in the orchard, and the work done in shop and class-room. Those who desire a fuller acquaintance with the College and its objects, may obtain catalogues by addressing President Fairchild. The terms of subscription to the Industrialist are made known in another place.

Trees for Kansas again.

In response to a request, and at the risk of repeating what has already appeared in the Industrialist this season, we give the following items, in reference to the trees best adapted to the climate in the western half of our State, together with brief hints as to their planting and culture.

In planting for shelter, and where immediate results are of prime importance, we will continue to plant the cottonwood, box-elder, soft maple, and willows. While planting these less valuable kinds for shelter, some better kind ought to be planted for timber and fuel. For these purposes, the walnut, honey locust, osage orange, red elm, white elm, hackberry, black locust and green ash, are more or less valuable, and are mostly of moderately quick growth. The hardy catalpa is giving promise of great usefulness here, and will probably prove worthy of extended planting. On higher grounds, the ailantus is worth more than ordinarily supposed.

The cottonwood and willows are easily grown from cuttings, which should be gathered and planted deeply, as soon as the spring is fully opened.

The catalpa, ailantus, and ash seed will grow if kept dry until planting time. The seed of the honey locust and coffee bean require soaking in hot water to ensure their germination, as the very thick seed-coats may not otherwise soften the same season they are planted. The nuts, and the seed of most trees in fact, germinate more surely and regularly if kept in moist, cool earth or sand during the winter. This end is best attained by bedding them out in a well-drained spot, and covering them with a few inches of mellow soil or other mulch. They are to be taken from this bed in the spring, and planted where they are to grow. Some seeds of this class are said to start fairly well, even if they have been kept dry through winter, if they are treated to prolonged soaking in cold water previous to planting. This is suggested only as a resort in case seed properly treated cannot be obtained. Such seeds, however, can be purchased now of responsible dealers, with the certainty of their being in good germinating condition.

Practically, it pays to give the ground set apart for tree-planting thorough preparation. One or two years of cultivation is the least that will accomplish this. In planting, a more erect and vigorous growth is assured by planting close. The trees, for the first few years, require the mutual protection afforded by close planting; and cultivation may sooner be dispensed with. While it is advised to plant close, it by no means follows that the trees are allowed to remain as close as planted. By close planting is here meant, in rows three or four feet apart, the trees standing one to two feet in the rows. While a great advantage to the young trees, such planting calls for attention to the thinning out of the plantation as fast as required by the growth of the trees. Let the young trees have thorough and clean cultivation until they begin to shade the ground, so that weeds will not grow to their injury. Aside from necessary thinning, they will need little attention to pruning, as the close growth will soon shade out the lower branches and encourage the upward growth of the leading shoots.

It is scarcely necessary to urge the importance of tree-planting to a Kansan: he appreciates that. The only difficulty with him is, that he is tempted to wait another year to begin. The coming season may be a very favorable one, and it is highly important that a beginning should be made at once. A difference of a year in the planting of trees, makes an equal difference, and may make more, in the time that must pass before the trees are available as timber.—*Prof. Popenoe.*

Forest Culture.

According to the report of the Government surveyors, the area of Kansas was originally 95 per cent prairie, and 5 per cent timbered land. The earliest settlers sought timber claims; and, in many cases, cleared up the land as fast as they were able. In a prairie country, a mere sprinkling of forest trees or shrubs is called timber. Probably not more than two per cent of the area of Kansas, is now devoted to the growth of forest trees.

The price of wood, fence-posts, and railroad ties is annually advancing. Black walnut and other native timber is becoming scarce, even in the timbered portions of the State. The timber question in Kansas is becoming more and more serious each succeeding year.

Thus far, all legislative efforts to encourage the culture of forest trees, have had reference to the frontier counties. While something has been accomplished, the results have not, as a whole, been satisfactory. It is because forest culture is not pioneer work. It belongs to a later stage in the development of a prairie country. It is on improved farms, and among farmers who are forehanded, that the greatest results from legislative encouragement may be expected. The State has paid bounties for stone and hedge fences: could it not, on the ground of the public good, offer bounties for groves of forest trees?

And yet there are stronger inducements to the farmers of Kansas to plant forest trees than any bounty that the State can offer.

First: It pays, and pays well. It is well known that the price of good timber land is from two to three times that of raw prairie. An artificial grove of forest trees, containing from five to ten acres, enhances the value of an improved farm from twenty to thirty per cent. Let two farms in the same neighborhood, of equal size and equal improvements in other respects, be offered for sale: the one with a small grove of forest trees upon it, judiciously located, will be sold first, and for twenty-five per cent more than the other. A twenty-acre grove of black-walnut trees, twenty years of age, on a quarter section, would be more valuable than the rest of the section.

Second: The ease with which the native forest trees can be raised in Kansas, is another great inducement. The methods of planting and culture are well known. They have been published in the *Kansas Farmer* again and again. It is the united testimony of those who have successfully engaged in raising forest trees, that nothing else has paid them better. Let the good work go on until every farm in Kansas has a timber lot.—*Prof. Ward.*

THE INDUSTRIALIST.

SATURDAY, MARCH 19, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

The book-keeping class is enjoying a short term of commercial law, with Prof. Ward.

Single copies of this issue of the Industrialist can be had for a three-cent stamp, by applying to A. A. Stewart, Manhattan, Kansas.

"All flesh is grass;" and a large part of the Industrialist is this week devoted to the culture of the same useful herbs, for which we are not disposed to offer an apology.

Dr. Haigh, of Chicago, who is now in attendance upon the meeting of the Baptist Home Missionary Society, held in Manhattan, conducted chapel exercises on Friday morning; and afterward gave the students a short speech, which was heartily applauded.

The Combination Gas Machine Company, of Detroit, Mich., writes that the new gasoline apparatus for our laboratory will be sent next week. It will be put in working order at once.

We are under obligations to Prof. C. L. Ingersoll for the sixth annual report of the faculty and officers of Purdue University, Indiana; and to Prof. Chas. Garfield for a copy of Prof. Steere's lecture on the "Migration of Michigan Birds."

Many inquiries are received at the College nowadays for Berkshire pigs and yearling Short-horn bulls. We have now no Short-horn bulls over six months old for sale; and of Berkshires, we can only offer pigs and young sows of various ages (good ones) at moderate prices.

Professor Beal, of the Michigan Agricultural College, in a recent article, makes the alarming statement that there are in Europe "mills which make a regular business of grinding quartz rocks. This is sifted to the proper size, dyed yellow, and sold to mix with clover seeds which are sold by weight." This points the moral of what is said in another place about the difficulty of obtaining good grass seeds.

Professor Walters has designed a large picture (17½x22 inches) of the new College building, as it will be when finished. In the rustic border encircling the same, are shown the present buildings on the new and old farm, together with the names of the present Board of Regents and Faculty. The whole ink drawing is decidedly neat and life-like. He is corresponding with engraving and lithographing establishments about its reproduction on steel or stone; and, if a plate does not cost too much, we may some day be able to surprise our friends with a tasty parlor ornament.

Society Hall, March 12th, 1881.

The Webster Society convened in Society Hall at the usual hour, President Myers in the chair. Debate, as to the relative convenience of a canal or railway across the Isthmus, was decided in favor of the canal. The order of extemporaneous speaking received due consideration. After recess, M. A. Reeve favored the Society with a fine selection in reading. Under order of new business, L. H. Neiswender was duly elected librarian. Programme for next week: Question, "*Resolved*, That Mexico should be annexed to the United States." Affirmative, Chas. Bailey and W. Knaus; negative, B. Buchli and J. C. Allen. *Reporter* will be presented by W. A. Corey. Call.

The last number of the Brookville *Transcript* contains a very pleasant description of the editor's recent visit to the College, which, had we the space, we should publish in full. The article concludes as follows:—

"In the brief time at our command, it was impossible to take more than a cursory glance over the College; and, in this brief space, it is impossible to say all that we would like to of it. Suffice it to say, that the Faculty is an exceptionally able one, thoroughly qualified in every way. They are placing their Institution in the very front rank. Every Kansan should be proud of it, and send his children there to be educated. * * * * * In every department, the school is doing first-class work. One might spend a week visiting the class-rooms, and not get tired. We enjoyed our visit thoroughly, and hope, ere long, to have the pleasure of repeating it. We received many courtesies from the officers of the College, and others, for which we return our thanks."

Society Hall, March 18, 1881.

The Alpha Betas assembled in the Hall immediately after rhetoricals. Debate was decided in favor of the negative. The fine music furnished by the committee was thoroughly enjoyed by all. Extemporaneous speaking was followed by a short recess, after which the first half of the *Gleaner* was presented by Mr. Hopper, and the second half by Miss Lightfoot. The committee appointed to obtain subscriptions for an organ for the use of the Society, reported that they did not consider it best to take any action on it at present: their report was accepted. Next *Gleaner* is to be presented by Gus Platt and Miss McElroy. Question to be debated next week, "*Resolved*, That the best interests of good government and morality demand that every man should exercise his religious views with freedom and without restraint." Affirmative, W. J. Lightfoot and W. J. Jeffery; negative, F. M. Jeffery and Mr. Ward. Select reading, Miss Ella Mackey; essay, Mr. Kern. Theta.

DRILL CLUB.

Notwithstanding the muddy weather of last Tuesday evening, a large number of members were present to display their powers in picking out the crooks and snarls that are so plenty in the law of the parliamentarian. They are accomplishing this end most effectually, as was shown by last evening's exercise. After roll-call, the minutes of the preceding meeting were read, and Mr. Culter made a member of the Club. The chairman of the committee on jurisprudence made some good remarks on the points under dispute at preceding meeting. Committee on programme being absent, the Club proceeded at once to the election of officers; and, after a spirited contest, in which much ability in parliamentary tactics was displayed, the following persons were elected: President, Jacob Lund; marshal, W. Knaus. The secretary holds over. Mr. Culter was appointed to fill a vacancy in the jurisprudence committee. After the appointment of a committee on programme, the Club adjourned. A lively time anticipated at next meeting.

St. Augustine.

THE INDUSTRIALIST.

SATURDAY, MARCH 19, 1881.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

Instrumental Music.—Provision is made for the teaching of music upon instruments of all sorts. The College furnishes piano and organ for practice, but the teacher depends upon his pupils for his income. Lessons may be weekly or semi-weekly, and all practice at the College must be under the direction of the music teacher. Weekly lessons are sixty cents each; semi-weekly, fifty cents each. Students in a class of two or more can receive instruction at reduced rates, as the number may warrant. Harmony and composition are taught if desired.

THE SPRING TERM.

The winter term of twelve weeks closes with examinations on Friday, March 25th. The spring term begins on Monday, March 28th, and closes with commencment exercises, on Wednesday, June 8th. Students already in the regular course find this term quite essential to their successful progress. Those about to enter will need better preparation than was required for the previous terms of the year. Examination for entering includes Reading, Spelling, Writing, Geography, Arithmetic, and the elements of English Grammar. Classes will recite on the first day of the term, and new students arrange to begin, if possible, with the classes.

The following branches will be taught in classes arranged with reference to general advancement of students:—

First Year.—Algebra. English Composition. Botany, with Drawing. English Drill. U. S. History. Book-keeping.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—U. S. Constitution. Political Economy. Agricultural Chemistry.

Students are admitted to such studies as they are able to pursue to advantage, though advised to follow essentially the regular course, so far as they can. Drawing, music, and the various industrial arts named elsewhere, are so arranged as to accommodate students of all grades of advancement.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument,	$1.00
Private lessons, 1 a week, on any instrument,	.60
Class lessons, 2 a week, on any instrument,	.65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, APRIL 2, 1881. No. 33.

KANSAS STATE AGRICULTURAL COLLEGE.

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T. T. HAWKES, *Sup't Mechanical Department.*
A. A. STEWART, *Sup't Printing Department.*
I. D. GRAHAM, *Sup't Telegraph Department.*
MRS. M. E. CRIPPS, *Sup't Sewing Department.*
W. L. HOFER, *Teacher of Instrumental Music.*

COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.
GEO. C. WILDER, Agent.

Report of the Printing Department.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—The following is a brief report of the work of the Printing Department, for the year ending June 30, 1880.

There have been about the usual number of students enrolled during the several terms, and nearly all have made commendable progress. The work of the department for the year past has differed but little from that of previous years. In February last, by your permission, the printing-office was removed from Mechanics' Hall to the southwest room of the Chemical Laboratory. This change is a very acceptable one, enabling us to receive more students than formerly, and to arrange the office in a much more convenient way.

Since the College year closed, a few fonts of new type have been purchased, and the Mechanical Department has furnished us with a large pine case, neatly made, to receive proper stationery, books, etc., belonging to the office. These additional facilities prepare us to do more satisfactory work than heretofore.

In addition to the usual printing which the departments require, we have printed, in pamphlet form, 500 copies of the address delivered by Judge Thacher at the late commencement. We have also begun work on the College catalogue. It is expected to contain forty pages, and 3,000 copies are to be issued.

I herewith present, in tabular form, an exhibit of the receipts and expenditures of this department for the year past. From this statement, you will find that the expenses of the department exceed its receipts by about $100. When we consider that the INDUSTRIALIST is the greatest item of expense, and that it is not run for profit, but purely as an advertising medium, I think the showing made is a very respectable one.

RECEIPTS, 1879-80.

MONTHS.	Students' fees..	Advertising. ...	Subscriptions...	Sales of paper, envelopes, etc.	Credits from other departments .....
July	.....	$15 00	$0 80	.....	.....
August	.....	80	7 45	.....	$ 7 75
September	$30 00	.....	7 85	$3 15	14 00
October	23 50	4 50	6 55	40	7 80
November	25 50	.....	3 15	2 95	5 70
December	12 50	6 25	6 35	2 00	3 70
January	19 25	.....	4 90	75	1 25
February	25 00	.....	1 65	50	12 85
March	18 00	2 50	1 25	.....	3 00
April	15 00	.....	4 80	2 10	1 50
May	14 00	50 40	2 00	.....	12 55
June	3 00	5 00	75	.....	10 50
Totals	$185 75	$84 45	$47 50	$11 85	$80 60

DISBURSEMENTS, 1879-80.

MONTHS.	Students' pay roll.....	Supplies—Paper, ink, type, etc., and express and freight on same.....	Postage	Incidentals.....
July	$ 1 85	$70 40	.....	.....
August	10 40	4 20	.....	.....
September	15 45	2 88	$ 6 50	.....
October	14 70	11 50	2 20	.....
November	15 40	.....	1 80	.....
December	18 90	44 90	2 52	$0 75
January	16 85	74 82	1 90	.....
February	14 70	6 90	1 88	2 10
March	17 80	5 60	1 95	50
April	13 95	2 80	24 26	.....
May	18 00	.....	2 70	.....
June	24 05	36 17	1 76	55
Totals	$182 05	$260 17	$47 45	$3 90

Our facilities for instruction would be greatly increased by the purchase of one or more reference books. I would therefore respectfully ask you to provide my department with "Rounds' Printers' Cabinet," and "Ringwalt's Encyclopedia of Printing," price $4 and $10. Respectfully submitted.
A. A. STEWART, *Superintendent.*

Report of Telegraph Department, 1879-80.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—Allow me to call your attention to the following brief report of the Telegraph Department, for the year ending June 30, 1880.

The total number of students enrolled in the department during the year, was fifty-nine: of this number, eighteen were ladies, and forty-one gentlemen. The average attendance per term was twenty-seven.

The running expenses of the department for the year were as follows:—

Blue vitriol	$36 85
Zinc	8 47
Bills of other departments	7 00
Student labor	17 83
Total	$70 15

There were fifty pounds of zinc on hand at the beginning of the year, that do not enter into this statement.

Including additions of one mile of wire, new battery, and a few telegraph poles to the inventory, and refitting of some old instruments, the total expenses of the department were $117.87; the total receipts were $123.50;—leaving a balance in favor of the department of $5.63 over all outlays.

As the course of training in this art is made to extend over two years, and properly so, the progress made by the students during the past year has been quite flattering. The class was taught, first, the telegraphic characters and their combinations; and after sufficient skill in transmitting and receiving had been acquired, they were drilled in the sending and receiving of messages, press reports, train orders, abbreviations, and all the practice necessary to make them familiar with and expert in the management of a telegraph line. And, as part of the drill, they were required to send messages to each other, using the tariff provided for the line; to keep a record of business transacted; and make reports to the Superintendent, as is required by telegraph companies.

In addition to this, the class received a course of instruction in the building and management of the line; the plant and maintenance of batteries; various forms and modifications of instruments, and how to use them. The strength, tension and measurement of the current, and the duplex and quadruplex systems of telegraphy were discussed and explained as well as the means of illustration at hand would permit.

At the beginning of the year, the department had but one advanced student: now there are six (three ladies and three gentlemen) working on the lines of the American Union, Western Union, and Atlantic & Pacific telegraph companies. As there is a demand for good operators, it is fair to suppose that, had more of the students taken time to become proficient, this number might have been larger.

The department yet needs a few things to enable it to accomplish its work more perfectly. I am glad to notice that an appropriation has been made by the Board for the purchase of new poles. As soon as satisfactory arrangements can be made, they will be put up, and the line placed in good condition. The accompanying estimate represents the present needs of the department.

I should be pleased to have the Board visit the department, and note its condition and wants. Respectfully submitted.
I. D. GRAHAM, *Superintendent.*

Our Exchanges.

Seed wheat is scarce. Some one should ship some into the county, for which they would find ready sale.—*Roscoe Tribune.*

A race between a pony and a physician here created a small bubble Tuesday evening last. The doctor came out ahead.—*Gould Pioneer.*

C. Borin, of the Osborne *Truth-Teller*, has skipped the country. He was under bonds to appear at court in defense of a libel suit.—*Logan Enterprise.*

One hundred and thirty-one pieces of land were proved up on in this county between March 1st, 1880, and March 1st, 1881. This amounts to about 16,000 acres of land added to the taxable property of the county.—*Great Bend Register.*

Three hundred and fifteen building permits have been issued since October 15th, 1880, when the practice was inaugurated. These permits are issued only for new buildings and such improvements, and they average $495 to each permit.—*N. Topeka Times.*

A valuable cow, the property of Wm. Sare, was bitten by a dog two or three weeks ago. Last Friday she began to show symptoms of "going mad," which continued until Saturday, when it was thought best to kill her, which was accordingly done.—*Thayer Headlight.*

We have a sample of sugar, manufactured by Samuel Wickery, from the sap of soft maples grown on his farm six miles south of the city. This sap makes beautiful syrup and sugar, equal to that manufactured from the hard maple groves of Ohio and Indiana.—*Sumner County Press.*

Hon. A. L. Redden has just added three hundred standard volumes to his law library. With this addition, he now has a collection of over five hundred volumes, carefully selected. To the casual observer, it would seem that five hundred large volumes would contain about all the law that it is necessary to have.—*Eldorado Press.*

One day this week, a Buckeye farmer started for town with a hog in his wagon. About four miles from town, the hog jumped out and the farmer followed suit. When he had caught the hog, he turned to find his horses, but they were well on their way to town and were not stopped until they reached the city. The wagon was very badly demolished.—*Abilene Chronicle.*

A stock company, named the Rice County Coal and Prospecting Mining Company, has just been formed in Little River, with capital stock of $10,000, and par value of shares $5,000, for the purpose of sinking a shaft 1,000 feet on a lead of coal in this county. We are not informed where the lead is located, but hope the work will prove a success.—*Sterling Bulletin.*

Mr. A. B. Whiting returned to-day from a visit to Davis county. At Milford, on the Republican river, the ferry-boat had been washed away, leaving suspended in the air, the wire cable, which was utilized in an odd way by those desiring to cross. A crockery crate was slung under the cable or pully, and the passengers climbed in by a ladder on either side. The crate being cut loose, it would descend with great rapidity, just touching the water in the center of the river; and the impetus would carry it part way up the grade, and the occupants of the crate, never more than four, would haul hand over hand until the terminal air station on the other side was reached. The return was made in the same way; and the appearance of the crate, as it descended the curve, was somewhat similar to that of a basket full of human beings shot out of a mortar.—*Topeka Capital.*

THE INDUSTRIALIST.

SATURDAY, APRIL 2, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Pond Fish.

We have watched the experimental work of the State Fish Commissioner for some time past with a great deal of interest, partly because the work is in itself an interesting one, and partly because it has to do with to us one of the most interesting branches of natural history, regarding which less is known, perhaps, than of any other. From these and other experiments, we expect to add largely to our knowledge of the finny denizens of our waters, at least from an economic point of view.

If the importation of the German carp for our lakes, ponds, and dams, and of the salmon trout and schoodic salmon for our streams, proves successful,—and the Commissioner seems to think it will,—the waters of this State will, for an inland State, be pretty well supplied with this kind of live stock. Fish farming for profit is, of course, only at an experimental stage in this State; but it is a success in other States, and here it seems to promise a large per cent of profit for the amount of time and money invested. Upon very many of the farms of the State, the cost of preparing a pond suitable for fish gardening, would be small; the stocking of the pond with fry would cost less; and the care necessary to the raising of a good crop would amount to nothing. The spawn of a single carp — numbering, according to some authorities, 700,000 eggs — would give a goodly number to begin with. The carp attains a length of from one to two feet, but is generally less than one foot in length. It feeds upon aquatic plants, insects, and worms; and, like a chicken, will eat almost anything, and is itself most excellent eating.

Having our pond stocked with carp, we might add a few varieties of our "native talent," by way of a change. Of these, we think the black bass would prove satisfactory: we know it has elsewhere. Although it is properly a stream fish, it lives and does nicely in lakes and ponds which are well supplied with spring water. The black bass is second only to the trout in game qualities; and, upon the table, is about equal to it. In some of the streams of this State, the bass is somewhat numerous; but, like the trout, it is hard to catch. It feeds upon insects, craw-fish, etc., and attains a weight of four and even five pounds.

The black perch is also a fine fish, though a small one, weighing generally from a half-pound to two pounds, but is sometimes found to weigh as high as three pounds. His haunts are various, as he is both a stream and pond fish. In a pond which is fed by a brook or rivulet, perch thrive very fast, and increase rapidly in number. From the fact that the perch is a very common fish, being found in almost every stream, pond and lake; and from the fact that in most waters where perch live are found larger fish,—he seems not to be held in much repute as a food fish. He is really deserving of more attention, as upon the table he is perhaps second to none but the trout and bass in flavor and delicacy.

We might name other fish suitable for the pond; but the three named would, we are convinced, stock a pond with enough of variety and of quality to satisfy an ordinary epicure, and with a quantity sufficient to supply any family and to pay expenses, and leave a fair margin from the sale of surplus. At least, we think the experiment will bear a trial.—*Sup't Graham.*

Puffing Books.

There is nothing more disgusting in journalism than the prevailing custom of puffing up books that have no merits except probably the style of printing and binding. At present, it threatens to beat even the patent medicine slobber of the past decade. Not only backwood weeklies but leading dailies, religious papers, and literary journals of high standing, forget their dignity occasionally, and, for a "free copy," brag up some fool's errand in the mystic fields of literature, in leaded gush by the half-column.

Some time ago, we read, in the catalogue of new books of Chas. Scribner's Sons, a leading publishing house of Boston, of "W. Walker's Handbook of Drawing." The work was highly recommended there: "First American, from the second English edition. Upwards of two hundred wood-cuts and diagrams. Introduction; thirty-seven topics, with appendix; 267 pages of text; well bound;" etc., etc. Here followed a long list of special qualities too numerous to mention. With this notice, containing, we acknowledge, nothing but the truth well told, the boom began; and the slobber of the work that we read for the five months following, would fill a small volume. Political, religious, educational, and art journals tried to surpass each other in the invention of sorghum phrases for the occasion; and the writer of this was induced to — buy the book.

An examination of the book proved it to be inferior, notwithstanding the name of the publishing house, the third edition, the wood-cuts, and the substantial binding. We were cheated, though we do not see how we could have helped it. Advertising pays — the seller at least.

To substantiate what we have said about the book, we will mention the diagrams in the chapter on technical perspective, where mistakes abound. It may be said, however, that the book is fully as good as hundreds of others in this and other fields of literature, science, and art. Like others, it was written for money, published for money, and puffed for a "free copy." But, while the writer and the publisher were probably honest in their endeavors to produce a good book, and while their advertisements of it contained but facts, we doubt the sincerity of every one of the different journals that puffed it. Either their editors must have known that they were exaggerating the virtues of the work, or they should have known that they were incapable of judging it. It sometimes seems to be true that the less a person knows about a subject, the more he can say of it.—*Prof. Walters.*

Our Ideal.

In all ages, the aim of education has been to produce an image of the ideal man and woman of that time. From the educational efforts of a period, we can deduce the ideal. When the Greeks instructed their youths in gymnastics, art, and philosophy, the ideal must have been a healthy, art-loving philosopher. When the Romans, adopting the culture of the Greeks, substituted military tactics for gymnastics, and elocution for art, the ideal must have undergone a corresponding change,—from the philosopher and sculptor to the warrior and orator. When, during the middle ages, learning and education centered at the gloomy monasteries, the ideal must have been a long-bearded ascetic. And when, later on, the great universities were founded,—when classic lore revived, and mathematics began their rapid development,—the ideal must have dropped the heavy gown and become a classic scholar.

It has often been said, feared, or hoped, that the ideal American had changed, was changing, or would change; that he was greatly different, more practical and scientific, now than fifty or a hundred years ago. A glance at the schools and colleges of the country will give us an answer.

The reports of the educational department of the Government show that the United States have 358 colleges and universities, 125 schools of theology, 50 schools of law, 116 schools of medicine, dentistry and kindred subjects, 76 schools of science, 10 schools of art, 151 teachers' seminaries, and only about 75 institutions that give, or pretend to give, instruction in the mechanic arts, agriculture, mining, etc.; and it can be said of many of these that, to use the phrase of a present member of Congress, they are simply "literary kites with agricultural tails." While some of the universities and colleges enumerated above also give scientific courses, an investigation of the reports goes to show that most of them make no effort as yet to put the scientific departments on an equal basis with their classical ones. In nearly all of them, the ratio of students as well as teaching forces, between the literary and scientific departments, is a very unequal one. Often, there are no graduates in the scientific branches for years. There are 129 commercial and business schools reported; but these are mostly of an inferior character, with short courses, and more than balanced by the 1,227 academies and 114 preparatories, with an aggregate of 112,000 pupils. If the 51 reform schools are subtracted, only a very limited number of industrial schools remain. The ratio between literary and scientific institutions for the superior instruction of women, is still more unfavorable for the latter. Of the 225 institutions, hardly a dozen give thorough courses in the sciences, and less than that number teach technical knowledge.

These institutions were founded to supply an existing demand; for the laws of supply and demand govern education as well as industry and commerce. They cost millions of dollars; and the people that pay for them enquire closely before they buy. While more and better schools are wished by the majority, the present educational system is certainly the most suitable that could be bought for the efforts it costs.

These institutions answer that the ideal American is still a classic scholar,—a Webster or a Bryant rather than an Eads or an Edison, an orator or a statesman rather than a builder or an agriculturist.—*Prof. Walters.*

Agriculture in Old Japan.

From the last number of the Yokohoma (Japan) *Herald*, we clip the following brief sketch of the work now being done by government authority for the advancement of agriculture in that far-off land. Those of our farmers who are active in institute work and agricultural experiments, will be surprised to learn that these almond-eyed orientals are following our "advanced agriculturist" very closely, if they have not already overtaken him: —

"The report of the Bureau of Industry of Hiogo Ken for last month, contains matter of more than ordinary interest, and shows that, in some respects at least, the officials of the Bureau are successful in directing increased attention to improvements in agriculture. There are in the number before us descriptions of experiments made in this district with new kinds of rice and wheat, and also some remarks upon a cattle market. We learn, also, that a meeting has been held at the village office of Yabe-gori, when addresses were delivered upon the varieties of rice most suitable for different localities, and the best description of manure to use in cultivating cereals. Fish manure was awarded the palm for rice, and guano for wheat.

"It is also announced that experiments are about to be made in manufacturing sugar from *ruzoku*, a description of sorghum recently introduced from China. A table of the coincident degrees of the Fahrenheit, Centigrade and Reaumur thermometers is appended, with rules for converting Fahrenheit to Centigrade, &c.; and the number closes with a variety of minor items of information. Altogether, this useful publication is calculated to be productive of much advantage to the classes for whose benefit the Bureau is intended."

Educational Gossip.

Gaylord is figuring on a substantial new school building.

State Superintendent Speer attended the Superintendents' Convention at Washington, D. C., in February.

Prof. McBride, of Hutchinson, writes that he has a class in geometry and trigonometry that will favorably compare with such classes in the University and in the Agricultural College. Hutchinson should offer him an engagement for life.

State Sup't Speer says, in regard to the institute work of the coming summer: "It is well to begin by employing good teachers of teachers, and concentrating their best work upon the common branches and how to teach them. Let the advanced work be the speciality of those pursuing it, but not of the institute."

A school superintendent that has to visit over one hundred district schools during the country-school season, must skip around lively. The task is quite something, considering that most districts have but three or four months of school, that the superintendent has to be in his office at the county seat one day in the week, that school is kept only five days out of six, and that the salary is so low that many of them will have to travel footback.

The State Board of Education, at its recent session, authorized the members of the faculties of the State University, the Agricultural College, and the State Normal School, also graduates of normal schools, to do institute work without special certificates. Certificates were issued to the following: P. J. Williams, Ottawa; Wm. Wheeler, Ottawa; H. D. McCarty, Highland; F. A. Fitzpatrick, Leavenworth; L. A. Thomas, Topeka; John Wherrell, Paola; E. Miller, Lawrence; L. M. Knowles, Peabody; B. T. Davis, Emporia; L. G. A. Copley, Wichita; Geo. W. Winans, Waterville; P. J. Carmichael, Emporia; P. Fales, Ottawa; W. W. Grant, Leavenworth; J. H. Lawhead, Fort Scott.

A meeting was held in Kansas City last Wednesday evening to organize a District Telephone company comprising Kansas City, Leavenworth, Atchison and Topeka. It is understood that a charter has been obtained, and all the preliminary steps taken except to procure a franchise from the Bell Telephone company; and, when that is done, the work of putting up the wires will be pushed right along. The wires will connect with the telephone exchanges in the various towns; and for a trifling consideration any telephone, in any city, can converse in other cities. It is expected that the new system of wires will be in operation within six weeks or two months at most. The scheme meets with general favor wherever broached.

An act passed by the last Legislature provides that the following county superintendents shall receive a salary of one thousand dollars per annum: Atchison, Bourbon, Brown, Butler, Chautauqua, Cherokee, Cloud, Coffey, Cowley, Crawford, Dickinson, Doniphan, Douglas, Elk, Franklin, Jefferson, Jewell, Johnson, Labette, Leavenworth, Linn, Lyon, Marion, Marshall, McPherson, Miami, Mitchell, Montgomery, Nemaha, Osage, Osborne, Pottawatomie, Reno, Republic, Sedgwick, Shawnee, Smith, Sumner, Washington, and Wilson. In the following counties, the superintendents receive a less compensation, as follows: Allen, $980; Greenwood, $850; Jackson, $960; Philips, $920; Clay, $920; Ottawa, $920; Anderson, $860; Morris, $860; Saline, $860; Barton, $840; Lincoln, $820; Wabaunsee, $800; Harvey, $780; Rice, $780; Riley, $780; Ellsworth, $760; Woodson, $700; Rooks, $660; Ellis, $640; Russell, $620; Chase, $600; Norton, $600; Pawnee, $530; Rush, $540; Davis, $500; Stafford, $500; Harper, $400. All superintendents receiving over $600 per annum are required to devote their entire time to the duties of the office. Among the several provisions regulating their duties is one requiring them to visit every school in their respective counties at least once each year.

THE INDUSTRIALIST.

SATURDAY, APRIL 2, 1881.

BONDS WANTED.

The highest market price paid for school bonds, bridge bonds, or other safe securities, by the Loan Commissioner. Correspondence solicited.

M. L. WARD, Loan Commissioner.

TO BUILDERS.

Sealed proposals for the erection of the central structure of the main building of the Kansas State Agricultural College, will be received by the Board of Regents until 7 P. M. of April 13th, 1881, at the office of the Secretary, in Manhattan. Plans and specifications can be seen at the same office, and at the office of E. T. Carr, architect, Topeka, Kansas, after March 30th. Separate bids are desired upon stone-work, frame and wood-work, plastering, and painting, as well as upon the structure complete. All bids must be accompanied by a guarantee of responsibility; and the right to reject any or all bids is reserved.

GEO. T. FAIRCHILD, *Secretary of Board.*

State Agricultural College, Manhattan, Kansas, March 9th, 1881.

All bills against the College, in any department, should be presented at once.

The sidewalk in front of the Laboratory, and running from thence to the Main Building, is being lowered and changed to better lines.

The plans and specifications for the new building are engaging the attention of builders this week. A lively competition is probable over so large a structure.

The Board of Regents meet on the evening of Wednesday, April 13th, to consider proposals for erection of the new building, and to make the usual quarterly settlement of accounts.

Hon. John A. Anderson was on the Hill yesterday. After a hearty handshaking all around, he interviewed the Mechanical Department, ordering a draughting-board and a T-square. To judge from appearances, he is going to recreate his political mind with rural architecture.

That ridiculous and disgusting relic of mediæval barbarism, All Fools' Day, seems to have met with slight recognition hereabouts. A solitary prank, the making of a false grade-sheet, which was posted conspicuously on the bulletin board, created some consternation, and made a good deal of fun for the knowing ones.

Running north from the west end of Societies' Hall is a lane, recently constructed, which is to be guarded at its north end by a self-opening gate, and at the south end by a hand gate. As soon as the gates can be completed, this will be the regular road to and from the College buildings for those whose business calls them on the grounds.

On Tuesday a pair of Berkshires, a few days over one year old and weighing respectfully 475 and 425 lbs. with the crates, were shipped from the College farm. As the crates weighed less than one hundred pounds, and the pigs had been kept in store condition only, it will be seen that the little Berkshires are really very *big* when brought to the scales.

The numerous volumes of Bancroft's History of the United States, and several other works on the colonial period of New England, in our library, were interviewed this week by Prof. Robert Hay, who expects to put the main part of this month into reading history, and studying geology and mineralogy, at this Institution. The Professor is always a welcome visitor.

From the general tenor of the valedictory of the retiring editor of the *Kansas Farmer*, we judge that Mr. F. D. Coburn will hereafter have the editorial control of that paper. Mr. Coburn is a vigorous, incisive writer, who has already had much experience in the field of agricultural literature. His management of the *Farmer*, during the last two months, has been very satisfactory to the readers and friends of that journal.

The social and musical entertainment at President Fairchild's home, on Tuesday evening, was a most enjoyable affair throughout. The music was of a high order without being top-loftical; and, while your local scribe is not musical, he confesses that on this particular occasion music gave him sincere pleasure. The graceful hospitalities of the presidential mansion will long be remembered by those who were its guests on Tuesday evening.

We see, by the last number of the *Kansas Farmer*, that, on account of ill health, Mr. E. E. Ewing has been compelled to retire from the management of that paper, which is hereafter to be under the control of the "Kansas Farmer Co." Under Mr. Ewing's able, conservative management, the *Farmer* has taken a high rank among periodicals of its class; and its influence for good to the agriculture of the State and West has been great. We sincerely hope that Mr. Ewing will not, for slight reasons, abandon the profession of journalism.

Everybody in Kansas should keep posted as to State news; and we know of no better way than to read the Leavenworth *Weekly Times*. Each week it has four or five columns of choice miscellany selected from its Kansas exchanges, which feature is alone worth the price of subscription. Besides this, you always find the best farm department, Washington news, ringing editorials, and items of especial interest to western readers. Address THE TIMES, Leavenworth, Kansas.

The classes of the spring term are in full working order under the following arrangement of hours:—

First hour.—Agricultural Chemistry, two hours. Entomology. Algebra. English.

Second hour.—Political Economy. Analytical Chemistry. Geometry. Book-keeping.

Third hour.—United States Constitution. Analytical Chemistry. Composition. English.

Fourth hour.—General History. Surveying. Analytical Chemistry. Botany. Drawing.

Fifth hour.—Household Economy. U. S. History. Drawing. Botany.

SOCIETY HALL, March 25th, 1881.

The Alpha Beta Society convened immediately after the lecture by Prof. Platt, President Jeffery in the chair. Debate on the question, "Shall Religious Liberty be allowed to all?" decided in the affirmative. Extemporaneous speaking was entered into with some spirit. Our present system of preparing questions seems to be a poor one, as there is seldom enough prepared. The usual interest was manifested in the other exercises. After the assignment of duties, the Society adjourned. Z.

SOCIETY HALL, March 26, 1881.

The Webster Hall was filled to overflowing, owing to the fact that we had promised something more than ordinary. The promise was well kept. After the preliminary exercises, the debate was entered upon with an earnestness that surprised even the Websters. Each speaker filled his allotted time; and it must have taxed the judges: however, the majority decided in favor of the negative. Mr. Ward then read a piece entitled "Parin' Bee," which was enjoyed by all. Mr. Smith recited "Burgoyne's Surrender" with credit to himself and the Society for rhetorical ability. Mr. Mason gave his ideas of "What shall we do?" in a well-prepared composition; after which we listened to the reading of science, history, fiction, and "locals" from the columns of the Webster *Reporter*, as presented under the editorship of Mr. Thompson. The next meeting will be occupied mostly in the election of officers. If you Websters expect an office, you must come out. SIR.

The Manhattan INDUSTRIALIST is the smallest paper, we believe, in the State; but it is the ablest. —*Hartford Call.*

We are glad to add to our exchange list that neatly printed and ably edited Agricultural College journal, the INDUSTRIALIST. Although not large in size, it is sound and scientific; and the College Faculty and students may well feel proud of their vigorous organ, more particularly because it advocates a useful, appropriate, and practical education for the people.—*Howard Rural.*

THE SPRING TERM.

The winter term of twelve weeks closes with examinations on Friday, March 25th. The spring term begins on Monday, March 28th, and closes with commencment exercises, on Wednesday, June 8th. Students already in the regular course find this term quite essential to their successful progress. Those about to enter will need better preparation than was required for the previous terms of the year. Examination for entering includes Reading, Spelling, Writing, Geography, Arithmetic, and the elements of English Grammar. Classes will recite on the first day of the term, and new students arrange to begin, if possible, with the classes.

The following branches will be taught in classes arranged with reference to general advancement of students:—

First Year.—Algebra. English Composition. Botany, with Drawing. English Drill. U. S. History. Book-keeping.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—U. S. Constitution. Political Economy. Agricultural Chemistry.

Students are admitted to such studies as they are able to pursue to advantage, though advised to follow essentially the regular course, so far as they can. Drawing, music, and the various industrial arts named elsewhere, are so arranged as to accommodate students of all grades of advancement.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

Are you Going West?

All persons contemplating removal to Colorado, Wyoming, the Black Hills, Utah, Idaho, Montana, Nevada, Oregon, Washington or California, should correspond with J. W. Morse, General Passenger Agent Union Pacific Railway, Omaha, Nebraska, before purchasing tickets via any other line. Information of value, relative to routes, rates, inducements to settlers, etc., together with carefully prepared and reliable publications descriptive of the States and Territories named, will be mailed free upon application.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil, climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain.—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blow-pipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying; leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotyping, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, APRIL 9, 1881. No. 34.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. W. J. JEFFERY, President.
MISS MAY QUINBY, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
WIRT S. MYERS, President.
H. L. CALL, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M.

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Abstract of Librarian's Reports.

1878–9.

The library has been again removed, this time to a couple of rooms in the new building, where it will probably remain until a room is especially provided for it. The library is open five days in the week, from eight o'clock A. M. until one o'clock P. M., for free access to students, assistant librarians being in charge. The exchanges of the INDUSTRIALIST (over one hundred State papers), and a few other papers furnished by members of the Faculty, are kept on file in the library. There have been added to the library during the year, chiefly through the courtesy of the Hon. John A. Anderson, M. C., about sixty Government reports, many of them of great value.

The Librarian would again respectfully urge on the Board the necessity of replenishing the library. He would call especial attention to the fact, that the Encyclopedia Britanica—a library in itself—is now passing through a ninth edition, and can be procured on easy terms. An appropriation of sixty dollars would procure the ten volumes already published; and by an annual outlay of a few dollars the whole work can be secured.

1879–80.

GENTLEMEN:—I herewith submit my annual report as Librarian. The following is a list of works added to the library during the past year. (Names of books omitted.) The whole number of additions, for the year, is 195, about two-thirds of which are bound volumes. The semi-monthly reports from the Patent Office have been regularly received and are accessible to students. Ten volumes of the Encyclopedia Britanica have been purchased, and the whole work subscribed for. The books have been classified and arranged by subjects, so far as our present shelving would admit. The library has been accessible to students at all hours of the school-day during the entire year. The greater part of the students each spend an hour a day in the library.

The College is indebted to the Kansas Congressional delegation for valuable U. S. public documents; to G. C. Brackett, Secretary of the Kansas Horticultural Society, nearly a complete set of the annual reports of that Society; to the State officers of Michigan, for Michigan reports; and to Hon. C. L. Flint, Secretary of the Board of Agriculture for Massachusetts, for valuable reports from that State. The donations from Michigan and Massachusetts were procured through the personal efforts of President Fairchild, who is manifesting a great interest in the College library.

The Librarian would again urge upon the Board the necessity of making on effort to secure a liberal appropriation from the Legislature, for the benefit of the library of the Agricultural College.

Respectfully submitted.
M. L. WARD, *Librarian.*
Manhattan, Kansas, June 30, 1880.

Report of the Household Department.

To the Board of Regents of the Kansas State Agricultural College:—

GENTLEMEN:—I submit to you the following report of instruction in the Sewing Department.

Since my last report, in 1878, 125 students have been taught in the different branches of hand and machine sewing. With the exception of one term, I have taught five classes, often remaining in the afternoon. A good degree of proficiency has been attained. Cutting, fitting and designing are taught comprehensively in the department. Most of the work by machine has been executed in a superior manner, owing to the fact that two excellent machines were put into the department last fall, by your permission; viz., the New Home and Royal St. John. In addition to these, there are in the department the American, Secor, Wheeler & Wilson, and Wilcox & Gibbs.

HYGIENE.

Two classes in hygiene have been taught, numbering four and seven, with pleasure to the teacher, and, I trust, with profit to the students, judging from the interest evinced by all in the classes, and that polite attention so dear to every teacher's heart, giving not only pleasure but a true incentive to further and better effort, raising the office of teaching from the low ground of drudgery or duty to the position of giving and receiving. I hope, at no distant day, that educators may be brought to realize that the subjects relating to physical health shall be of the same educational importance as those relating to the intellect. The times demand that women should thoroughly understand the *laws of health*, and that their education should tend in that direction. A few lessons from the mother in childhood might save many a community from diseases that are epidemic.

HOUSEHOLD ECONOMY.

Two classes have been taught in household economy, numbering nine and eight. The plan of teaching has been much the same as heretofore. Different subjects of importance to women as housekeepers, wives and mothers, have been taken up, and by my endeavors to educate by lectures, have given the class an opportunity to express their opinions and convictions on the subject in a concise form, as the different topics in the lecture were taken up; and, discussed. As much practical work has been done as was possible with the appliances and accommodations of the kitchen. This department can easily be made self-supporting.

Respectfully,
MRS. M. E. CRIPPS,
Superintendent Sewing Department.

THE banker cannot invest a million dollars safely without knowledge of finance: the captain with no knowledge of navigation, would sink his ship. In no business is the serving of an apprenticeship more necessary than to him who plants an orchard for profit. He must know how to select the site and the varieties best adapted to his locality; he must select fruit that can be marketed to the best advantage; understand just how much to manure for the best results; know about cultivation, pruning, thinning, sorting, packing, shipping and selling: and these may involve innumerable qualifications. It would be interesting to inquire how many millions of trees have been set out for market orchards, by persons who knew nothing of any of these particulars, and who supposed that all they had to do was to buy the trees and set them, when they would grow, take care of themselves, and, without further attention, bear heavy crops of silver dollars.—*J. J. Thomas, as quoted by Green's Fruit-Grower.*

THE fifteen glucose factories that were in operation in this country in 1879, produced the great quantity of 360,000,000 pounds; and there have been built since that year two or three factories that can turn out 500,000 pounds per day. If the production of this article is doubled in the next year, as some believe it will be, and if thirty-six pounds of glucose can be produced from a bushel, it will require the consumption of 20,000,000 bushels of corn.—*Cincinnati Grange Bulletin.*

Our Exchanges.

Men may come, and men may go; but it appears at present as though the exodusters intended to come on forever. Only about 250 of them arrived in North Topeka yesterday.—*North Topeka Times.*

The Grange elevator has been sold. The officers of the organization have been agreeably relieved of the responsibility of its liabilities. It will be converted into a first-class flouring mill and elevator.—*Wichita Beacon.*

A couple of boys seven years old were accidentally fastened in the Onaga schoolhouse; and their friends scoured the country for miles around in search of them, before thinking to look there for them.—*Kaw Valley Times.*

The first car-load of salt shipped from the Alma salt works, was sent away this week. They are now manufacturing an exceedingly fine quality of salt; and we understand that Mr. Wright is making a success of the salt works.—*Alma Herald.*

There are now in the State penitentiary 665 inmates, nearly 100 less than last year. Between now and July 1st about 100 more leave. If something isn't done, the coal shaft will soon be short of hands. 15,000 bushels of coal were got out of the shaft last month. By July 1st, every State building in Kansas will be supplied with coal from the shaft at the penitentiary.—*Capital.*

Gov. St. John made the following appointments yesterday: V. P. Wilson, of Abilene, regent of the Sate University for three years from April 1; Edwin Tucker, of Eureka, regent of the State Normal School for four years from April 1; Amasa T. Sharpe, of Ottawa, and Chas. E. Faulkner, of Salina, members of the board of trustees of State charitable institutions, each for three years from April 1.—*Commonwealth.*

New Jersey, which has grown to be a busy hive of manufactories, has taken up industrial education, for which there has been a growing popular demand. The legislature has just rounded out the State's system of education by appropriating $5,000 to every city and town that will raise as much for instruction in industrial, mechanical, and agricultural pursuits. The schools are to be under the supervision of a board of eight trustees, one of them to be the governor; and Newark has alredy taken steps to secure a school. The legislature of two years ago tried to establish industrial schools; but the law was inadequate for the purpose.—*Leavenworth Times.*

The True Way.

The following, from the Smith County *Pioneer*, coincides precisely with our views of education:—

"The true way to educate children is to teach them the dignity of labor, either of brain or hand or both; to direct their studies with a view to practical utility; to give a firm, broad foundation; and upon that you may rear what superstructure you will. Teach your daughter the mystery of housewifery and plain sewing, give her a thorough instruction in the elementary branches, take care that she can read well, speak and write her native language understandingly, and work a practical business problem for her father; then, if circumstances will permit, let her capabilities bound her acquirements. But, even here, the practical should not be lost sight of. A knowledge of current events is of more value than the acquisition of a deal of language; and a knowledge of the laws and customs of our own and contemporary governments, is of more worth than the lore of Grecian mythology."

THE INDUSTRIALIST.

SATURDAY, APRIL 9, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Book-keeping for Farmers.

Farmers often receive gratuitous advice from those who have never had charge of a farm; or, if they have tried farming, it has been from the gentleman-farmer standpoint, in which a fair income, aside from the receipts of the farm, is necessary to meet current expenses. The most of the advice from such sources is the merest bosh, and does not merit the least attention. It is a favorite theory with many of these parties, that the chief remedy for all the ills of the farmer, is a thorough system of book-keeping. Among other advantages of such a course, it is claimed that, by charging to each crop all expenditures for labor in preparing soil, procuring seed and fertilizers if the latter be used, harvesting, marketing, etc., and crediting it with all receipts from the sale of the crop, the farmer will be able to tell positively, in just so many dollars and cents, the gain or loss from a given crop; that from these data the more profitable crop may always be known; and that the wise farmer will continue to cultivate those crops which pay best, and discard all others. When it is urged that farmers as well as other men should keep strict accounts of their business transactions, we heartily second it. It is justly said that farmers have nothing like a correct idea of the cost of a bushel of corn or wheat, or of a ton of hay or millet. Of course, the cost of the several crops will be nearly the same, whether the yield is good or otherwise; and the cost per bushel will vary accordingly.

We have no other measure of wealth of any kind than the labor necessary to produce it. And, while in case of a light yield of any particular crop, its market value justly may not be proportionate to the labor put upon it, the labor necessarily involved in its production should gauge the value. But, when the producer himself cannot even approximately tell the cost of an article, and hence its value, it is not to be presumed that any one else can do so. Hence the cost of production is only a remote factor in placing values upon farm products. Who can say that it would not, in time, be otherwise if such a system of accounts were generally kept with the farm that full and accurate knowledge of cost were in reach of those who control market values?

But all this is not what I started out to say. I desire to dissent from more than a partial acceptance of the view that keeping books will enable the farmer to discriminate between different crops, and to decide, from its better returns, which should be exclusively grown. The obstacles in the way of such a course are various and real. If fertilizers are applied, their effect extends over a period of several years. It is manifestly impossible to debit each crop with its proper share of the expense. In a system of high farming, where fertilizers are freely and regularly applied, this difficulty is greater than under our rough system. In some cases, draining and subsoiling complicate the matter still more: their effect is not confined to the present crop. But, in a larger sense, this difficulty is met in all farm operations. The cultivation of one crop prepares the soil for the succeeding one. Some crops are known as cleansers, from the opportunity they give to destroy weeds; while the continued growing of other crops permits the ground to become foul. The alternation of these crops is attended with the best results. The labor put upon the hoed crop, to cleanse it and bring it into condition to make the succeeding crop profitable, should not all be charged to the first. Further, the nitrification and weathering resulting from keeping the soil open and porous, feed the succeeding small-grain crops quite as much as they do the corn whose cultivation induces these chemical changes. For these and other reasons, the comparison of the accounts with different kinds of crops has little value. The accounts with fields differently treated may admit comparison. Good results will follow from doing business in a business-like way; but let us not take fancies for realities.—*Prof. Failyer.*

Dogs.

At a recent meeting of the Farmers' Institute, held at Manhattan, a paper was read setting forth the great advantages of Kansas as a sheep-raising State, and that the greatest obstacle to this branch of industry was the existence of dogs. It argued that, as an important occupation was thus impeded, and the material wealth of the farmers and of the State as a whole was thus hindered, therefore dogs should be slain.

The writer recommended an indiscriminate slaughter of the entire canine race, and that so heavy a tax should be placed upon a man who would persist in keeping one of these animals as to practically remove them from the bounds of the State. The sentiments of this paper seemed to meet with a response from the entire membership of the Institute. At least there was not a man to offer a word in defense of the animals in question. My sympathies for this time-honored family pet were immediately enlisted; and I felt inclined to offer a plea in his behalf, which I restrained with difficulty.

The fact is, there is not in the whole round of domestic animals another one that possesses anything like the intelligence and real sagacity of the dog. There is not another that manifests such an amount of affection for his master. He has been known to show this in many different ways. The dog also exhibits the greatest amount of faithfulness to his master's interests. He has been known to risk his life in defense of his master's person or property, and to guard a child even from all harm. These qualities fit him pre-eminently for a companion and family pet,—so much so that a person becomes exceedingly attached to his dog; and, when you touch a man's dog, you touch his owner in a very tender spot. It has been said that the quickest way to get up a quarrel between two persons, is to set their dogs to fighting. The dog is such an object of affection, that there is more real mourning by an entire family at the death of a good one, than there would be at the loss of a cow, or even a horse.

But the greatest value of the dog is seen when we consider him as a protector of life and property. Who can tell the number of wanton, cold-blooded murders that would have been committed, had it not been for the presence of this faithful watchman, to give the timely warning of danger? Undoubtedly these faithful animals have prevented horse-stealing in Riley county, to a greater amount and value than would pay for all the sheep that were ever brought to this county; and more poultry has been protected from the ravages of chicken thieves, coyotes, pole-cats and rats, than would pay ten times over for all the sheep ever killed by dogs in this county. When we add to this the protection to other property,—of gardens and fields from the attacks of unruly animals, either running at large or breaking away from the control of their owners,—we see that this indiscriminate slaughter would be a great detriment to the best interests of the people. Some dogs are even valuable to the shepherd in the care of his sheep, and in protecting them from wolves.

'Tis true that many dogs are comparatively worthless, while others are very noble animals, and would no more think of killing a sheep than they would of killing a man. There is just as much difference in the blood of dogs as there is between the blood of a thorough-bred Short-horn steer and a scrub. And, if our friends who cry out so loudly against the worthless cur would take a little of the same pains to improve the breed of dogs that they do to improve their cattle and sheep, we should soon have no more sheep-killing dogs.—*Prof. Platt.*

Weather Prophets.

We have previously spoken, in these columns, of the few general principles that may give a very general idea of the weather that may be expected in the future. These are the general similarity of corresponding seasons, and the uniformity of climate. We may, of course, expect the weather of any future month to not depart far from the average of this month in the past; and also that one extreme will be followed by the opposite extreme, and thus preserve the uniformity. But attempts other than this to forecast the weather, and especially upon particular days, are futile. Weather prophets, however, may rest assured that they will find plenty of followers: people like to be humbugged. The few predictions by the prophets that are fulfilled are of two classes,—those that any observant person might make, and a few accidental coincidences. But the great mass of those predictions not founded upon general principles come to naught. These failures are not thought of: they belong to the unaccountable, and are forgotten, while the few accidental fulfillments bring great notoriety to the party making them.

Isaac P. Noyes, in the April number of the Kansas City *Review*, deals hard blows to the latest weather prophet, Mr. Vennor. Vennor predicted the usual January thaw, several months in advance. But this time, as if to expose such charlatans, the weather outdid its proverbial fickleness by not letting up during the month. The variance of the weather from the prediction was so marked, that the prophet felt called upon to come out in a card to explain the discrepancy. He need not have done so: his failure was not different from that of all others who have presumed to forecast the weather for periods so far in the future that no meteorological data immediately affects the conclusion. And this card only serves to call attention to his untrustworthiness as a prophet. Who will be the next candidate for the honors of the weather prognosticator?—*Prof. Failyer.*

Broom-corn.

A writer in the Lyons *Republican* says, "A great many have asked me how to raise broom-corn, and does it pay. I will give you the figures, and you can see for yourself. In the first place, it will cost a man just $40 a ton to harvest his first crop, counting lumber for sheds and all other expense, and $30 per ton for every year after. A man must have good sheds to dry it in; and, to raise fifty acres, a man should commence about the first of May to plant, and plant ten acres every ten days until done. My reason for planting that way is, that the corn won't all commence to brush out at once, and will not push you so hard. If properly handled, it is worth about $75 a ton. I sold mine last fall for $85 a ton, in the shed. It is a sure crop on sod. From four to five acres make a ton on sod, and three on old ground."

Educational Gossip.

The Sumner County Institute will be conducted by Prof. Knowles.

A Chautauqua county school teacher has a teacher's certificate signed by Jas. A. Garfield, the President, as one of the examining board.

Prof. Fitzpatrick, the efficient superintendent of the schools at Leavenworth City, has been re-appointed, and has had his salary increased two hundred dollars. He now receives $2,250.

It is now said that another daily paper is soon to make its appearance at Topeka, with Capt. Henry King as heavy writer, G. W. Martin as fighting editor, and Noble Prentis as funny man. A strong team. Go!

The Catholic college at St. Mary's Mission has an attendance of 155 pupils, and is in a prosperous condition. A large two-story building was erected last year, and another one will be commenced as soon as the weather will permit.

Mound City *Clarion:* Miss Jessie Smith, the fifth principal which the Mound City schools has had during the present school year, has completed her second week, and is still able for duty. The average life of a principal, during the current year, has been two weeks.

A teacher in Elk county thrashed a stubborn boy,—struck him four times and brought blood every time. The boy's stepfather had the teacher arrested and tried for assault and battery. The jury thought the teacher had not done anything for which he ought to be punished, so the prosecuting witness paid the costs, $42.

Washington, Washington county, is having a lively time about the re-appointment of a teacher of the intermediate department. Some claim that she is nervous, and others that she is not. The pupils seem to side with her, and are trying to persuade the members of the school board to reinstate her by tin-panning the night air about their front yards.

The high school now has thirty-eight scholars, a larger number than has ever been enrolled before. The senior class has taken up trigonometry, a new study, and is making good progress. The recent examination was the most rigid ever known; and every member of the senior class passed. The geological cabinet has been increased by a collection of fossils from the penitentiary coal shaft, secured by Prof. Bartlett, who passed a day in the bowels of the earth for that purpose.—*Champion.*

The Kansas Reform School, located at North Topeka, will probably be open by June 1st for the reception of inmates. The State Board of Charities has appointed Hon. I. P. Eckles, of Rice county, as Superintendent,—a good appointment. Mr. Eckles plans to devote a part of the time between now and the day of opening in visiting and studying the Ohio State Institution, at Lancaster, the celebrated Pennsylvania Reform School, at Philadelphia, and the Pontiac Institution, in Illinois.

Since the State has in a manner repudiated the Normal School, it remains for Emporia to look to her own interests, by aiding the school in every way possible. Perhaps never before were the departments so ably manned as at present. Under the management of our able President, the Normal is steadily gaining the confidence of the people; and, in elevating the scholarship of the different departments, our graduates will be more respected wherever they go. Four-fifths of the students are intelligent, earnest, active young men and women, striving with all their powers to attain excellence in the development of their manhood and womanhood.—*Emporia Ledger.*

State Superintendent Speer has sent out a written opinion in reply to an interrogatory addressed to him by county superintendent Frankenburger, of Bourbon county, in regard to whether exchange of work was prohibited between superintendents, during periods of county institutes. Sup't Speer, in his reply, directs attention to section two of the act referring thereto, explaining its obvious intent, and ruling that it is a violation of the act for county superintendents who receive a salary of over six hundred dollars to leave their respective counties to engage in normal-institute work elsewhere. This is an important decision, and should be generally known among educators throughout the State.—*Topeka Commonwealth.*

THE INDUSTRIALIST.

SATURDAY, APRIL 9, 1881.

BONDS WANTED.

The highest market price paid for school bonds, bridge bonds, or other safe securities, by the Loan Commissioner. Correspondence solicited.

M. L. WARD, Loan Commissioner.

TO BUILDERS.

Sealed proposals for the erection of the central structure of the main building of the Kansas State Agricultural College, will be received by the Board of Regents until 7 P. M. of April 13th, 1881, at the office of the Secretary, in Manhattan. Plans and specifications can be seen at the same office, and at the office of E. T. Carr, architect, Topeka, Kansas, after March 30th. Separate bids are desired upon stone-work, frame and wood-work, plastering, and painting, as well as upon the structure complete. All bids must be accompanied by a guarantee of responsibility; and the right to reject any or all bids is reserved.

GEO. T. FAIRCHILD, *Secretary of Board.*

State Agricultural College, Manhattan, Kansas, March 9th, 1881.

The Board of Regents meet on Wednesday evening next.

Sup't Graham received, this week, a live eel, which was caught in the Wild Cat creek, not far from the College.

The public exercises in Chapel yesterday consisted of declamations by the first division of the third-year class.

The Scientific Club is making an excursion today, to Prof. Hofer's farm, near Rocky Ford, to investigate an Indian or mound-builder's grave.

A Florida friend sends us a package of seeds resembling unhulled rice, of which we only know that they are to be planted "the same as rice corn."

At the Faculty meeting yesterday, it was decided that the next College sociable should be held on Friday eve next. The sociable committee will without doubt present an attractive programme.

The machine for preparing gasoline vapor as a substitute of gas, for use in the chemical laboratory, has just arrived, and will be placed in position at once. We shall have more to say about it when a full trial has been given it.

The mean temperature of March was 36°.21. Mean at 7 A. M. 29°.8; at 2 P. M., 45°; at 9 P. M. 35°. Minimum, 13°,—on the 5th; maximum, 72°,—on the 24th. Barometer: 7 A. M., 28.52; 2 P. M., 28.55; 9 P. M. 28.53; mean, 28.53⅓. Rain and melted snow, .75 inches; depth of snow, 9 inches, the greatest of the winter.

The rage for improvement shows no sign of abatement. The drives through the College grounds have been put in fair shape, new culverts have been put down, sidewalks have been changed and improved, and, last but not least, that fish pond has been commenced, and enough done to demonstrate its entire practicability.

Gov. St. John has recently appointed as Regents of the Agricultural College for the three years following April 1st, 1881, John Elliot, Manhattan, and V. V. Adamson, Holton, to succeed Hons. E. B. Purcell and W. L. Challiss, respectively. We are not acquainted with Mr. Adamson; but the appointment of Mr. John Elliot is excellent, and very satisfactory to the friends of the Institution hereabouts.

The Clay County *Dispatch*, or, as our paper is headed, "The Clay Dispatch. County," in a quarter-column editorial, strikes out vigorously for civil-service reform, considering it "surprising" that an "experienced, capable person" is displaced "for one who has had no experience, and whose appointment is an experiment, to say the least." This is our doctrine, Mr. Dispatch; but why does it not have a general application?

SOCIETY HALL, April 1st, 1881.

The Alpha Beta Society convened at the usual hour. About thirty-five members were present. The election of officers for the new term occupied nearly the entire time of the meeting. There was quite a close contest between two of the nominees for president. The election resulted as follows: President, F. M. Jeffery; Vice-President, T. J. Willard; Secretary, Miss Pope; Treasurer, C. H. Stiles; Marshal, W. J. Jeffery. The reading of the *Gleaner*, etc., was postponed until next week.

THETA.

SOCIETY HALL, April 8th, 1881.

Alpha Beta Society called to order by President W. J. Jeffery. After the opening exercises, the officers elected at the last meeting were installed. The valedictory and inaugural addresses were listened to with interest. The *Gleaner* was presented by Mr. Platt and Miss McElroy. Extemporaneous speaking followed by an intermission of five minutes. The solo by Miss Bacheller was indeed very excellent. The debate by Messrs. Short, Willard, Hopper and Miss Short was good. The leaders in debate for next week are Miss Whaley and Miss Reba Coburn. Select reading by Mr. Deets. Declamation by Mell Platt.

H. B. L.

SOCIETY HALL, April 2, 1881.

A fair representation of the Websters convened at Society Hall last Saturday evening. It being the time for the election of officers, the Society proceeded at once to that business, passing the regular order of exercises. The following members were elected to office: President, S. C. Mason; Vice-President, J. C. Allen; Secretary, R. A. Hollenberg; Treasurer, Edwin Fairchild; Librarian, L. H. Neiswender; Critic, A. E. Smith; Marshal, W. S. Myers. F. W. Bevington was initiated as a new member. All members then joined in extemporaneous speaking, which was quite animated. The question for debate next evening is, "*Resolved*, That a Republican form of government is the best for the nations of Europe." Affirmative, L. H. Neiswender and C. E. Wood; negative, F. W. Bevington and H. L. Call. The *Reporter* will be presented by A. E. Smith. After the report of critic and reading of minutes, the Society adjourned. A good time anticipated at next meeting.

ST. AUGUSTINE.

THE SPRING TERM.

The winter term of twelve weeks closes with examinations on Friday, March 25th. The spring term begins on Monday, March 28th, and closes with commencment exercises, on Wednesday, June 8th. Students already in the regular course find this term quite essential to their successful progress. Those about to enter will need better preparation than was required for the previous terms of the year. Examination for entering includes Reading, Spelling, Writing, Geography, Arithmetic, and the elements of English Grammar. Classes will recite on the first day of the term, and new students arrange to begin, if possible, with the classes.

The following branches will be taught in classes arranged with reference to general advancement of students:—

First Year.—Algebra. English Composition. Botany, with Drawing. English Drill. U. S. History. Book-keeping.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—U. S. Constitution, Political Economy. Agricultural Chemistry.

Students are admitted to such studies as they are able to pursue to advantage, though advised to follow essentially the regular course, so far as they can. Drawing, music, and the various industrial arts named elsewhere, are so arranged as to accommodate students of all grades of advancement.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

Are you Going West?

All persons contemplating removal to Colorado, Wyoming, the Black Hills, Utah, Idaho, Montana, Nevada, Oregon, Washington or California, should correspond with J. W. Morse, General Passenger Agent Union Pacific Railway, Omaha, Nebraska, before purchasing tickets via any other line. Information of value, relative to routes, rates, inducements to settlers, etc., together with carefully prepared and reliable publications descriptive of the States and Territories named, will be mailed free upon application.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed; the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blow-pipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying; leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

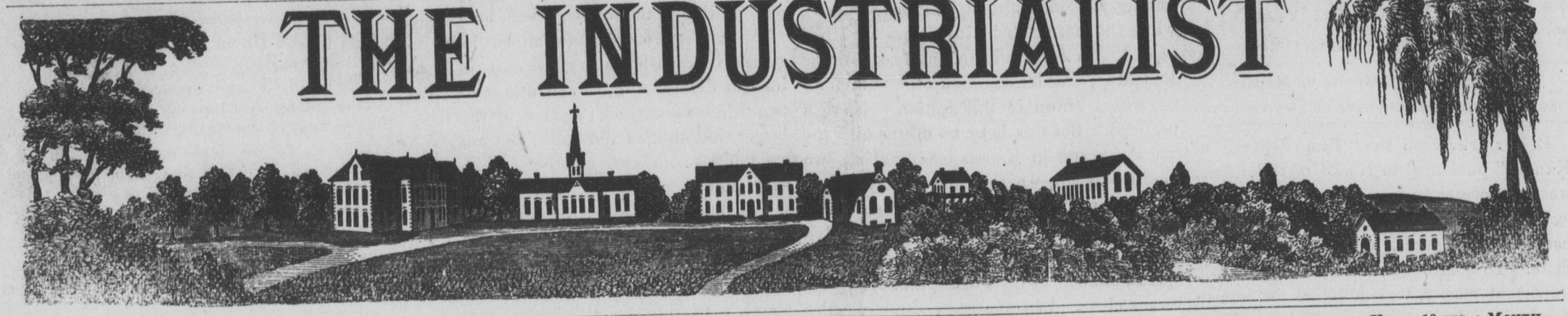
Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

F. G. Adams,

THE INDUSTRIALIST



PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, APRIL 16, 1881. No. 35.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,— may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. F. M. JEFFERY, President.
MISS GRACIA POPE, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
S. C. MASON, President.
R. A. HOLLENBERG, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.
GEO. C. WILDER, Agent.

Land Agent's Report, 1879-80.

To the Board of Regents of the Kansas State Agricultural College: —

GENTLEMEN: — Herewith find full report of all the transactions in my department for the year ending June 30, 1880, and also a complete statement of the securities in my custody, and of the lands now unsold; also the number of acres patented and to whom, and the amount of matured interest now past due, together with the amount of principal and interest collected during each month of the year just closed.

The sales during the past year aggregate 3,195.85 acres, for a total sum of $21,040.88, of which $3,357.27 was paid in cash, and $17,683.61 remains at ten per cent interest, secured by the land itself,— the title remaining in the State. The average price per acre, it will be seen, is $6.66: the average last year was $5.71. There were, at the close of last year, 26,160 acres unsold; added to this by cancellation and correction of list, 1,739.79 acres, and sold during the year 3,159.85 acres, leaving now unsold, 24,739.94 acres.

In October, 1879, by direction of the Board of Regents, I re-appraised all lands then unsold, visiting personally almost every forty-acre tract, and readjusted the prices. The result was an advance in the average price, making a total advance of about *eleven thousand dollars*, the object being to make as much as possible of our endowment. The lands are all choice, and purchased only for improvement, and usually by actual settlers.

During the past winter, I carefully examined the circumstances connected with our original selection of lands, by which the 90,000 acres granted by Congress was reduced by the officers in charge of the General Land Office at Washington to 82,313.53 acres; and, as shown by my report of February 10, 1880, it is quite probable that we may yet be indemnified for the 7,686.47 acres cut off by the double-minimum decision. The arguments presented by Hon. S. J. Crawford, agent for the State, in opening the case before the Commissioner of the General Land Office, in Washington, D. C., appear to be unanswerable. Copies of Mr. Crawford's brief and argument are in possession of the Board, and I need not allude to the subject more in detail.

I received from my predecessor a large amount of practically dead securities, and these have been carried along from year to year as though they were good, and the volume increased by cancellations, surrender of contracts, and forfeitures. During the last quarter of the fiscal year just closed, a thorough examination of all the securities was made by a committee of the Board of Regents, and the dead securities disposed of by proper action of the Board, so that those now in my custody are all supposed to be good, though some are considerably in arrears on interest. The entire value of the securities in my hands, June 30, 1880, was $75,026.29, represented by 500 notes and ten contracts. On this sum there is now past-due interest to the amount of $5,508.59, a very considerable portion of which will be paid within the next fiscal year, as special efforts are being made to that end.

The question of taxes is becoming a difficult one, since purchasers in some cases persist in letting the tax remain unpaid till the land is sold by the county. Although contracts made since the close of 1876 provide that the purchaser shall pay whatever taxes may be assessed against the land so purchased, yet there is difficulty in determining just when and how to commence proceedings to enforce the terms of the contract. I do not know of any better way than to commit the whole subject to the care of the attorney of the Board, for such action as the several circumstances may demand.

By the new form of contract, in use since March 1, 1880, notes are not given by the purchaser; and the securities are all in the form of contracts issued in duplicate. It is a simpler method, and, I think, will be found much better in practical use. In either case the land is security for the unpaid amounts,—patents being issued only on full payment of principal and interest.

Hereto attached are full statements of all the business in my department, in detail; and I desire that an examination of my books and accounts be made, and full settlement be had to date. The following are the schedules attached, which are a part and parcel of this report: —

SYNOPSIS OF REPORT AS TO SALES, RECEIPTS AND BALANCES, FOR YEAR ENDING JUNE 30, 1880.

LANDS.

Lands unsold, June 30, 1879	26,160.00 acres
Added to list by cancellation and correction	1,739.79 acres
Total on hand during the year	27,899.79 acres
Sold during the year ending June 30, 1880	3,159.85 acres
Total unsold June 30, 1880	24,739.94 acres

SALES ACCOUNT.

Received in cash, account sales	$ 3,357 27
Received in notes, account sales	17,683 61
Total receipts	$21,040 88

SECURITIES ACCOUNT.

Notes on hand June 30, 1879, as reported	$85,767 68
Notes and securities taken during the year	17,683 61
Total during the year ending June 30, 1880	$103,451 29
Retired by cancellation and full payment	28,425 00
Securities on hand June 30, 1880	$75,026 29

Interest due June 30, 1880, $5,508.59.

CASH ACCOUNT.

Received on account of sales of land	$3,357 27
Account of installments on former sales	18,499 79
Interest on installments	5,994 39
On delinquent interest (compound)	258 26
Total cash received	$28,109 71

Loan Commissioner's Report, 1878-80.

To the Board of Regents of the Kansas State Agricultural College: —

GENTLEMEN: —Herewith find report of the endowment funds of the Kansas State Agricultural College, as shown by the records of this office, for the two years ending June 30th, 1880: —

JULY 1, 1878, TO JUNE 30, 1879.

Invested in school bonds	$37,437 00
Invested in bridge bonds	800 00
Invested in tax redemptions	734 53
Invested during the year	$38,971 53

JULY 1, 1879, TO JUNE 30, 1880.

Invested in school bonds	$38,976 75
Tax certificates, Strickler estate	331 08
Amount invested for the year	$39,307 83

All of which is respectfully submitted, with the request that a committee be appointed to examine the books and papers of this office, that my accounts may be audited and approved.

Respectfully,
M. L. WARD, *Loan Commissioner.*
Manhattan, Kansas, June 30, 1880.

Farming, the leading Factor of American Wealth.

In writing to the *Country Gentleman*, John H. Dent, of Georgia says: "People may talk of political science, and the expert management of the politicians, and the financial skill of the secretary of the national treasury, but, for what the government is in wealth and greatness, it is indebted to the plow and nothing else. Agriculture and commerce sustain the country. Farmers as a class are not given that credit which they are entitled to as the factors of American wealth and the place she occupies among other nations. Let the plow fail, and it will be seen what railroad stocks, and other stocks that make millionaires, will be worth. I have noticed for forty years the progress of men engaged in the various pursuits; and farmers, as a class (although few make large fortunes at farming), hold their own better than any other class. Generally, what they get they keep; and they live at ease, in comfort and independence, throughout all the crashes and failures that take place among business men. Young men seem to think farming a menial occupation, when the truth is, the love of company and fine dressing are the allurements of a town life, not taking into consideration that all town employments are uncertain and dependent on circumstances. A farm, paid for and well managed, is the safest investment that can be made. True, there is no rapid fortune to be made by farming, but it insures to a man of industry and prudence a living of comfort and independence. I advise young men to embark in farming, if they desire a peaceful and happy life."

Our Exchanges.

The Golden Belt Editorial Association convenes on the 22d inst., at Salina.

The Chinese professor at Yale had one student last year. The student progressed so favorably that by the end of the session he was able to enjoy reading his first teachest.—*Capital.*

The mad-dog scare throughout the county has subsided into a settled determination to exterminate every straggling dog, that cannot give a perfect account of himself.—*Sumner County Press.*

Some of our exchanges are talking about their heavy men; but we doubt if there are four brothers who can outweigh the Shirck brothers, who live near this city, whose combined weight is 775 pounds.—*Waterville Telegraph.*

Three tow boats with barges left St. Louis Saturday, for New Orleans, with 350,000 bushels of wheat, 360,000 bushels of corn, and 25,000 bushels of oats, for foreign shipment. About 4,000,000 bushels of grain have gone down the river from St. Louis, since navigation opened.—*Exchange.*

Mr. Halloway, State Relief Commissioner, who has been looking over the western counties of the State, with a view of providing relief to the destitute, and to what extent it exists, says that all the reports as to extreme destitution and suffering are exaggerated and false; that he found many families "hard up," as he expressed it, and some needed relief, but nearly all of them were getting along, and would come out all right; and that the suffering he saw was for the want of proper shelter and fuel, which might exist in any prairie country. —*Exchange.*

Our hopes are beginning to wane. Notwithstanding the most favorable winter that could have passed over this country, the last two weeks of freezing and thawing, and the excessively dry weather, have effected the wheat seriously, especially where it has been drilled. It seems that the ground is heaved up with freezing and then settled again in thawing, which so loosens up the soil around the roots that the strong wind denudes them of the earth. The ground cracks open along the drills, and thus further exposes the wheat. At this writing it is safe to say that at least twenty-five per cent of the fall wheat crop is ruined; and, unless it rains soon, the demolition will continue. — *Beloit Courier.*

THE INDUSTRIALIST.

SATURDAY, APRIL 16, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

In our article on the "Tame Grasses in Kansas," published in No. 31 of this paper, we took occasion to caution our farmers against the worthless stuff sold under the name of grass seeds, in many parts of the State. To guard against imposition in this important matter, we counselled farmers to purchase seeds of the "large dealers in Chicago or St. Louis," knowing that better seeds may there be obtained for less money than can generally be had of the small local tradesmen. In saying this, we had no desire to discriminate against the many other localities where good honest seed is dealt in. We have reason to know that in Kansas City and other localities, grass and other farm seeds are sold in large quantities, and to the entire satisfaction of purchasers. The chances of imposition are greatly lessened by purchasing seeds of those dealers who handle large amounts of seed, changing their stock often; and this truth only we aimed to enforce in the article referred to above.—*Prof. Shelton.*

State Teachers' Association.

The next session of the State Teachers' Association will be held at Manhattan, commencing June 21st, 1881. From all indications, it will be a valuable one. The officers of the Association for the current year, all energetic and enthusiastic educators, are: President, Wm. Wheeler, Ottawa; Vice-President, John McDonald, Topeka; Secretary, F. W. Parsons, Osborne City; Treasurer, Miss Sarah A. Brown, Lawrence; Executive Committee, F. A. Fitzpatrick, Leavenworth, O. B. Wharton, Emporia, and Mrs. O. E. Stout, Holton. As a place for the meeting, Manhattan is favorably located, and has ever been in the front rank when education was the object. A meeting of the teachers of the town, the Faculty of the State Agricultural College, and of school friends, has been called for next week, to aid the executive committee in making arrangements for a convenient hall and cheap boarding accommodations. We also understand that the programme will be unusually rich and interesting. Every live teacher of the State should try to attend.—*Prof. Walters.*

The Wheat Crop.

The condition of the wheat crop in this section has been reported in these columns from time to time; and generally the opinion has been expressed, that the wheat fields were receiving great injury from the very severe winter just past. But the damage, whatever it may have been, done during the past winter, has been enormously increased by the very severe spring-winter of the past month and a half. We are satisfied that the injury done the crop before March 1st must be increased from fifteen to twenty-five per cent, and in many cases much more. This is certainly true of the wheat grown upon the College farm; and, from reports received from other sections of the State, we are satisfied that ours is not an exceptional case.

Our experimental wheat plats just now are peculiarly instructive. Some twenty odd sorts were sown last fall; and, of all these, not more than four or five have passed the winter without receiving much injury. The great part of each has been almost totally destroyed,—in many of the plats, not a green blade remaining. At this writing, the old-fashioned Blue Stem seems to have passed the winter in by far the best shape, having sustained almost no damage at all, while the hardy Red May comes in a bad second. In fact, fully one-half of all the Red May,—which makes up the bulk of all the wheat grown in this section,—is, with us, dead. But this is by no means all: the wheat harvest in Kansas is only about two months distant,—a time too short to admit of "stooling," or "tillering," or the application of any of nature's own recuperative processes. The exact causes of this wide-spread damage to the wheat plant are by no means clear. In some cases, doubtless, the heaving of the ground by the action of frost, and the consequent tearing of the roots of the plants, has caused the damage; but this by no means explains all the cases where damage has been done.—*Prof. Shelton.*

An Unjust Law.

While reading the amendment which was added last winter, by the Legislature, to chapter 122 of the session laws of 1876, it appeared to us that it contained some features likely to do a good deal of harm. Section 6 of the said amendment provides that "in no case shall a third-grade certificate be given a second time." Section 5 provides that "certificates of the second grade may be issued to persons who have taught successfully not less than three months," etc. Section 4 provides that "certificates of the first class shall not be issued to persons who have not taught successfully twelve months." Section 3 reads, "Certificates issued by county boards shall be of three grades—first, second and third; and shall continue in force respectively two years, one year, and six months." Now, putting these cited paragraphs together, what can a third-grade teacher do if he fails to get a school within three months after the examination? No matter how well he conducts his school, and what he knows, this law prevents him from ever teaching again in the same county, by shutting him off from all future examinations: more than that, it even prevents him from filling a three months' contract, in that case. It also compels the holder of a second-grade certificate to go at least twice through the hands of the board of examiners before he can have a possible chance to get a first-grade certificate.

But, supposing the third-grade teacher can get a school immediately after passing the examination, if he is not then seventeen years old he must wait until he has reached that age before he can teach again; for the same law provides that no second-grade certificate can be given to a candidate of a less age. It is quite amusing to think that a law should compel a teacher to work by jerks, as this virtually does. The amendment, together with the repeal of part of the original law, changes matters in various ways, not beneficial to the best interest of the State. Why was industrial drawing erased from the programme, together with the A grade? It is to be regretted that legislatures cannot find time to consider educational bills with more care before declaring them laws.—*Prof. Walters.*

That Eel.

It was stated in last week's INDUSTRIALIST that I had received a live eel, which had been caught in the Wildcat Creek, but no description was given. It is a lamprey, or lamper-eel; and, as this kind of fish seems to be of quite rare occurrence in the waters of this locality, we give a general description of it.

In general appearance, this fish much resembles the common mud-eel of this region, with this difference, that its mouth is furnished with a peculiar disc-shaped appendage, similar to that of the leech, by the aid of which it is enabled to attach itself to stones, other fish, etc. Its length is eight inches; diameter of body a little more than two-thirds of an inch; section of the head larger than that of the body; the anal and caudal fins connected together and the dorsal slightly connected with the caudal; mouth medium sized, with strait mandibulary plates; eyes rather prominent; body cylindrical, except near the caudal fin where it is slightly compressed; color blue-black above, with slight metallic luster, having no spots or marks, and lighter beneath. When found, this eel was attached by its leech-like mouth to a common buffalo fish, and was detached with much difficulty. It seemed very tenacious of life, remaining alive four or five hours after it had been taken from the water.

The method by which the lamprey obtains its food is much the same as that of the leech, except that the leech is a blood-sucker only, while the lamprey has teeth just in front of the œsophagus, by means of which it devours the flesh of its victim at its leisure. When once attached to a fish, the lamprey may remain its traveling companion at its own option; and the present specimen had undoubtedly traveled some distance with the school in its migrations.—*Sup't Graham.*

THAT prejudice against "them litery fellers," which in this country identifies statesmanship with ignorance, will be shocked to learn that one of the last performances of the author of Lothair before resigning office, was to make Owen Meredith an Earl, under the title of Earl Lytton, of Lytton and Viscount Knebworth. The new fellows who come in are almost all literary. Gladstone is a voluminous writer; the Duke of Argle is as proud of his literary record as he is of being the Macullum-More; Lord Selbourne has condescended to edit a hymn-book,—and a very good hymn-book it is, too; Vernon-Harcourt used to write for the *Saturday Review;* Foster has written a life of William Penn; Earl Granville is a man of great linguistic attainments; and, taken all together, the new Ministry, admittedly one of the strongest in point of statemanship and political influence that England has known for years, is undoubtedly the strongest in point of literary attainments and in the record of authorship among its members.—*Review of Science and Industry.*

Mr. A. D. Johnston recently shot and killed two double-crested cormorants in that region near La Cygne familiarly but not euphoniously known as "Hell's Bend." There were three of the birds in the flock; but he was successful in obtaining the body of only one of those he killed.—*La Cygne Journal.*

The freezing out of the winter wheat is not an incident peculiar to the Northwest, as some of our people suppose. The complaint is general all over the State. Immense damage has been done the crop; but we still hope it will come out better than is generally feared. Rain and a few warm days would make a great change for the better.—*Beloit Courier.*

Several head of cattle, belonging to Mr. Geo. E. Allen, became fast in the quicksand in the bed of the river, where they had been driven to drink. After considerable hard work, they were all extricated except two, they having been in the water so long and firmly imbedded in the sand, that Mr. Allen had them shot, killing them, thus quickly putting them out of their misery.—*Kansas Valley Times.*

A steer belonging to Mr. Bitter, on McKibben's farm, has, within the last few days, manifested symptoms of *rabies.* It was formerly quite tame, but is now extremely wild and irritable. The least movement among the cattle or animals near, excites it, rendering it wild and passionate. It attacks any living object that chances inadvertently to provoke it. The wild look, twitching of the muscles, and drivelling mouth, confirm the suspicion. One died a short time since with similar symptoms.—*Eureka Graphic.*

Educational Gossip.

The Choral Union of Manhattan is studying "Joseph."

Two hundred students have been enrolled at the State Normal, at Emporia, since the opening of the spring term.

Why can't we have an exhibition of school work in connection with the meeting of the State Teachers' Association this summer?

The baccalaureate sermon at the next commencement of the Kansas State University, will be delivered Sunday, June 5th, by President Anderson, of the Chicago University.

If the board of regents don't appoint a coal-oil inspector for the State Normal, Emporia will be favored with another display of pyrotechnics at the head of Commercial street, some of these fine evenings.—*Emporia Ledger.*

They are having a high-toned school near Washington. The school ma'am opens school regularly at the appointed hour, rings the bell, and goes through the usual preliminaries to empty benches, there being no pupils in attendance.

The school laws of the State require school districts in the State to have at least four months of school during the year; and, should the district fail or refuse to provide for a school, the county superintendent can make a levy and hire a teacher.

As it is probable the managers of the State Fair will offer premiums for educational work, teachers should hold examinations during the summer term, with a view to exhibiting the papers. They should also preserve maps and drawings, and encourage their pupils to make botanical, geological and entomological collections.—*Capital.*

The Osage County Teachers' Institute will be held at Burlingame, commencing on Monday, the 27th day of June. The conductor will be Prof. J. A. Race, of Glasgow, Missouri; and the instructors will be M. R. Barker, principal of the Burlingame city schools, J. E. D. Williamson, principal of the Osage City schools, and others who have not yet been selected.

Prof. Ross some time ago raised a small fund by private contribution for purchasing books for a library for the schools of this district. He has now a book-case with a capacity for about three hundred volumes, and has purchased about forty books with the money collected. The books are all standard works on subjects pertaining to matters connected with the pupils' regular studies.—*Eureka Herald.*

A competitive examination of candidates desiring the appointment as cadet to the West Point Military Academy, will be held by the respective county superintendents, at each county seat in the First Congressional District, Saturday, April 30th. Information in regard to qualifications and examination, can be obtained of any county superintendent in the District. The appointment will be made by Hon. Jno. A. Anderson as soon as the result of the examination is known; and the candidate must appear at the Military Academy for entrance examination, June 1st.

"Education does not begin with the alphabet. It begins with a mother's look; with a father's nod of approbation, or a sign of reproof; with a sister's gentle pressure of the hand, or a brother's noble forbearance; with a handful of flowers in the green and daisy meadow; with a bird's nest admired but not touched; with humming bees and glass bee-hives; with pleasant walks in shady lanes; and with the thoughts that are uttered in sweet and kindly tones, and words that mature to acts of benevolence, deeds of virtue, and to the perception of all good."

"School directors are largely responsible for the poor teaching done in many country schools. They are frequently too ready to employ the cheapest teacher that offers his services, paying less regard to his qualifications than to his price. The successful effort made to save five dollars a month in teachers' wages, has made many a school worthless for a term, and demoralized it for three or four terms. I am not pleading that teachers shall be paid exhorbitant wages; only for this, that directors shall recognize in their management of school affairs, as they do in their own business, that skill and special training and experience are things of value, and that ignorance and incompetency and inexperience are dear at any price."

THE INDUSTRIALIST.

SATURDAY, APRIL 16, 1881.

Mr. Dyche, of Boonesboro, Arkansas, sends us a box full of Bermuda grass sod, for trial upon the College farm.

Many students and friends will be glad to know that Eddie Fairchild is rapidly recovering from his late severe sickness.

Dr. Williston, a graduate of this College in 1872, and lately connected with Yale College, has given the College pleasant visits during the week.

Secretary Garfield, of the Michigan Horticultural Society, sends us copies of his report, and an interesting paper on "The School Garden," read before the Michigan Horticultural Society, at its December meeting.

The sociable of last eve was a very pleasant gathering of the Faculty and students and their friends. We take pleasure in stating that Pres. Wood, Col. McKay, and Mr. Redden, of the Board of Regents, were present, and seemed to enter heartily into the spirit of the occasion.

From Messrs. Trumbull, Reynolds, & Allen, seedsmen, of Kansas City, we have received their trade list and annual catalogue for 1881. This is an old-established, reliable house, doing a very large business in seeds of all kinds. We have reason to know that their goods are the very best.

Our miniature 'herring pond' is at last finished; and Mr. Commissioner Long sends word that he will be here on Wednesday of next week, for the purpose of stocking it with breeding carp. The "fish pond" has a superficial area of about 15x40 feet, and a depth of water varying from one to three and a half feet.

At the meeting of the Board of Regents yesterday, bids were opened and contracts let for the construction of the main college building. The stonework will be done by Ulrich Bros., the carpenter work by Jas. Lynch, and the painting and glazing by C. D. Marvin, all of Manhattan. The plastering was not let: for this part of the work, bids will be invited next fall some time.

Mr. Will Ulrich, of Ulrich Bros., contractors for the stone-work of the main college building, is a graduate of this College; and Mr. Jas. Lynch, who does the wood-work of the same building, is a student of three years' standing; — facts which speak whole encyclopædias for the practical character of this College. Both are energetic, capable young men, who will do work that will be a credit to all concerned.

SOCIETY HALL, April 15th, 1881.

Society called to order by Pres. F. M. Jeffery. As the Secretary, Miss Pope, had gone away from College, Miss Short was elected to fill the vacancy. The judges decided the debate in favor of the negative. A very good essay was read by Miss Noyes. Under miscellaneous business a committee was appointed to make arrangements for an entertainment. Committee, Wm. J. Lightfoot, J. T. Willard, and Anna Hunt. The question for debate next week is, "*Resolved*, That an international copyright would be a benefit to the American people." PHOTOPOUS.

The Kansas City *Review of Science and Industry* has just concluded its fourth volume. The fifth volume begins with the May number.

It is a strictly popular magazine, better adapted to family reading than any other scientific journal in the country. It comprises articles by the best writers, and selections from the best periodicals of this country and Europe, upon Geology, Mining, Archæology, Medicine and Hygiene, Explorations and Travels, History and Biography, Book Reviews, etc. It has played its full part among periodicals of the West, in calling attention to the natural resources and advantages of this region, and is deserving of the patronage of all intelligent and enterprising citizens.

Monthly; 64 pages octavo: $2.50 per annum. For advertising terms, address Theo. S. Case, Kansas City, Mo.

The Webster Society convened with a large attendance last Saturday evening. After the usual opening exercises, the officers elected at last meeting were inaugurated, with the exception of the vice-president and treasurer. Mr. R. K. Peck was initiated as a new member. Debate on the question, "*Resolved*, That a Republican form of government is the best for the nations of Europe," was quite spirited, and decided in favor of the negative. After a recess of a few minutes, the members and visitors joined in extemporaneous debate. A splendid number of the *Reporter* was presented by Mr. Smith. Members on other duties all present, and presented interesting articles. Question for debate next evening, "*Resolved*, That wealth has a greater controlling power than talent." Debaters on the affirmative, A. E. Smith and W. S. Myers; negative, Chas. Messenger and Geo. Thompson. After assignment of duties and report of critic, the Society adjourned.

ST. AUGUSTINE.

THE BOARD MEETING.

The regular quarterly meeting of the Board of Regents, called for April 13th, 8 P. M., found a quorum present; and, upon qualification of Messrs. John Elliot, of Manhattan, and V. V. Adamson, of Holton, the membership was complete, and all present.

The Board organized by election of annual officers: for President, S. M. Wood; and Vice-President, D. C. McKay.

The following standing committees were nominated by President Wood and approved by the Board: Farm Management — Regents McKay, Hoisington and Adamson; Horticulture — Regents Adamson, Elliot and Wood; Grounds and Buildings — Regents Elliot, Hoisington and Fairchild; Finances—Regents Redden, Fairchild, and Wood; Employes — Regents Hoisington, Redden, and McKay.

The quarterly report of the Land Agent was accepted and passed to the Secretary for record. Cases of delinquency in payment upon contract for lands, were considered; and the Agent was directed to notify the several parties of forfeiture under terms of contract.

The Treasurer reported the condition of sundry accounts, with recommendations, all of which were adopted.

Sealed proposals for constructing the new building in whole or in parts, were presented by Messrs. Hulse and Moses, J. H. Lynch, Ulrich Brothers, J. Winne, and C. D. Marvin, of Manhattan, and Messrs. Dawson & Anderson, of Holton. Upon opening the bids, those of Ulrich Brothers upon masonry, of J. H. Lynch upon carpentry, and of C. D. Marvin upon painting, were found lowest, and accepted upon condition of good and sufficient bondsmen. E. T. Carr was made supervising architect.

Regent Redden, Attorney for the Board, reported upon Stafford county school district bonds in dispute, with proposition of district No. 44, which was accepted.

Bills of the quarter, amounting to $6,240.32, were audited and allowed.

At a joint meeting of Board and Faculty, on Thursday evening, all were present except Mrs. Cripps, who was detained by illness. Each member of the Faculty presented the condition and wants of his department.

Expenditures were authorized for current expenses of departments, for book-case and finishing of wall in laboratory study, a diamond to cut glass, an imposing stone, roller mould, and slight improvements in the printing-office, a telegraph machine and electric bell, additional shelving for the library, repairs and improvements in the President's house, and incidental expenses of Commencement exercises.

The Faculty was requested to prepare and recommend lists of books for purchase, the proposed cost not to exceed the amount of appropriation, $1,000.

The committee on grounds and buildings was authorized to contract for outside painting upon the College buildings, the whole to be completed before the first of June next.

It was ordered that the fees charged to young men in printing and telegraphy be paid in advance for the term, and collected by the Secretary.

A deed was issued to Theo. Kreipe, upon land in Shawnee county, he having paid in full.

Board adjourned to Tuesday, June 7th next.

THE SPRING TERM.

The winter term of twelve weeks closes with examinations on Friday, March 25th. The spring term begins on Monday, March 28th, and closes with commencment exercises, on Wednesday, June 8th. Students already in the regular course find this term quite essential to their successful progress. Those about to enter will need better preparation than was required for the previous terms of the year. Examination for entering includes Reading, Spelling, Writing, Geography, Arithmetic, and the elements of English Grammar. Classes will recite on the first day of the term, and new students arrange to begin, if possible, with the classes.

The following branches will be taught in classes arranged with reference to general advancement of students: —

First Year.— Algebra. English Composition. Botany, with Drawing. English Drill. U. S. History. Book-keeping.

Second Year.— Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.— Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—U. S. Constitution. Political Economy. Agricultural Chemistry.

Students are admitted to such studies as they are able to pursue to advantage, though advised to follow essentially the regular course, so far as they can. Drawing, music, and the various industrial arts named elsewhere, are so arranged as to accommodate students of all grades of advancement.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed — outside of required hours of labor — upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education — using the term in its popular sense — can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

Are you Going West?

All persons contemplating removal to Colorado, Wyoming, the Black Hills, Utah, Idaho, Montana, Nevada, Oregon, Washington or California, should correspond with J. W. Morse, General Passenger Agent Union Pacific Railway, Omaha, Nebraska, before purchasing tickets via any other line. Information of value, relative to routes, rates, inducements to settlers, etc., together with carefully prepared and reliable publications descriptive of the States and Territories named, will be mailed free upon application.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil, climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the deve opment of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

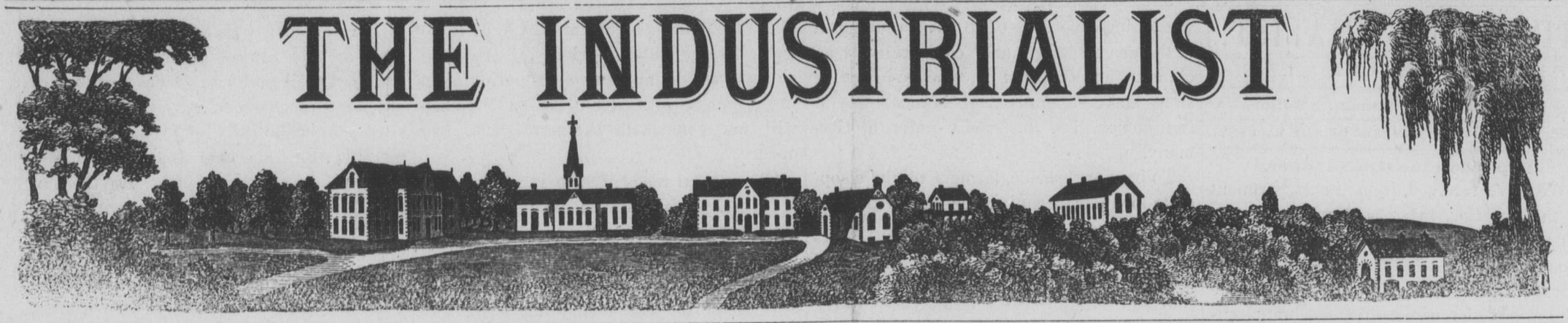
Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

THE INDUSTRIALIST



PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, APRIL 23, 1881. No. 36.

Irrigation in Kansas.

Kansas pluck and Kansas enterprise find another notable illustration in the case of those settlers who located along the Upper Arkansas Valley, west of the 100th meridian, in 1878, encouraged by the fine crops made in the far west that season. Two years of drouth followed; and crops could not be raised on account of the limited rainfall. The citizens, unwilling to leave so fair a country and so rich a soil, commenced digging ditches to convey water from the Arkansas River to their crops, and supply artificially what nature had denied them. One hundred acres were irrigated at Garden City in 1880, with results so satisfactory that twenty-seven miles of irrigating ditches have since been built.

We are in receipt of a neatly printed pamphlet, entitled, "Irrigation in Kansas," printed by Minnehaha Irrigating Company, of Topeka, Kansas. This company has among its stockholders many prominent officials of the Santa Fe Road. A ditch fifteen miles long, that will irrigate 20,000 acres on the south side of the Arkansas River, opposite Lakin, in Kearney County, is now under contract to be constructed at once. Water will be furnished to the farmers at one dollar per acre, for all that is necessary during the season. Government land can still be had along the line of this ditch, and the company expect these will be taken this spring. We think this idea of utilizing the rich bottom lands of the Upper Arkansas Valley by using the water so easily obtained from the river, is entirely practical, and cannot fail of success. The fertility of the soil of the plains is wonderful when it is ever so slightly moistened; and, if supplied constantly as proposed in this case, an abundant crop is assured in every season; and, what is equally as important, is its favorable location for supplying the mining regions of Colorado and New Mexico with grain, vegetables, fruit, etc., for which such high prices are now being paid all through the mining territory. Our readers, whether living in the west or elsewhere, will do well to send to the Minnehaha Irrigating Company, at Topeka, for a copy of the pamphlet, which will be sent free. They will get ideas about farming which, unless they have studied the matter, they have never thought of. The pamphlet also gives a synopsis of the laws relating to pre-empting and homesteading public lands.—*The Kansas Monthly.*

The Date in Algeria.

The date-tree requires not only abundant irrigation, but great solar heat. The Arabs say that it stands with its feet in the water, and its head in the fires of heaven. The love of the Arab for this precious tree may well be imagined, growing as it does in the sand, contenting itself with water so saline as to destroy ordinary vegetation, giving a grateful shade when all around is burnt up by the ardent heat of summer, resisting the winds which bend but cannot break its flexible branches, and affording a fruit sought for in every part of the world.

The male tree, of course, bears no fruit: it has merely a bunch of flowers enclosed, until maturity, in a spathe. The females have also a bunch of flowers, which, however, cannot become developed into fruit until fecundated by the pollen of the male flower. To insure this result, the Arabs ascend the trees in the month of April, and insert into every female spathe a portion of the pollen of the male flower. The fruit then begins to swell, and forms long clusters weighing from twenty to forty pounds, each tree producing from 100 to 200 pounds in a season. To multiply the date tree, the Arabs do not sow the seed, as they could not then be sure of the sex of the trees. They prefer to plant the suckers from the base of a female tree, whence the name "Phœnix." These become productive in about eight years, but do not attain full fruition before twenty or twenty-five. The trees will live for about 200 years: they are not worth preserving after a century. When they are no longer valuable for the fruit, the sap is extracted to make a kind of insipid wine, and the heart or cabbage of the tree is also eaten. They are then cut down; and the wood, although very inferior in quality, is here valuable, where no other kind can be procured. The roots are used for fencing and roofing; and the leaves are made into mats, baskets, sacks, and cord.

Like all other species of cultivated plants, the date-tree has numerous varieties. In the cases of the Zibas, seventy distinct varieties are recognized.

The trees come into flower in spring, in March or April, and the fruit is ripe about October. The date is called the king of the Sahara, and is regarded as the most nutritious of fruits. Many of the Arabs live on dates and bread.—*New York Tribune.*

Trichinæ in Man.

It has been previously stated, that, for some thirty years subsequent to the description of the capsule by Hilton, and some twenty-five years after the identification of the parasite itself in man, the same were looked upon as mere harmless curiosities; and that, though Leidy discovered the parasite in the flesh of swine, in 1847, still it was not until 1860 that the connection was established between them, appearing, as they had, in two totally different species,—men and swine. The honor of this important discovery belongs to Dr. Zenker, of Dresden, Germany. The disease was discovered in a servant-girl, admitted as a typhus patient to the city hospital in Dresden. She died, and her flesh was found to be completely infested with trichinæ.

Leuckart's and other experiments have shown that a temperature of 140° F. is necessary to render trichinæ inert. Direct heat applied to the slides holding specimens of trichinous pork, by means of the Shultz heating-table, has demonstrated, under the microscope, that a temperature of 50° C. (122 F.) is necessary to the certain death of the trichinæ.

Leisering's experiments with trichinous pork made up into sausage-meat and cooked twenty minutes, gave positive results when fed to one rabbit, and negative by another. He sums up his experiments as follows:—

1. Trichinæ are killed by long-continued salting of infected meat, and also by subjecting the same for twenty-four hours to the action of smoke in a heated chamber.

2. They are not killed by means of *cold* smoking for a period of three days; and it also appears that twenty minutes' cooking freshly prepared sausage-meat is sufficient to kill them in all cases.

The various kinds of cooking, however, are quite different in their effects on trichinous pork. Frying and boiling are most efficient, roasting coming next. Boiling coagulates the albumen on the outer surface, and allows the heat to penetrate less rapidly: it should be kept up, therefore, for at least two hours, for large pieces of meat. Whether boiled, broiled or fried, pork should always be thoroughly cooked.

Practically speaking, the cooking, salting, and hot smoking, which pork in its various forms receives in the United States, must be in vast majority of cases sufficient to kill the trichinæ and prevent infection of the persons consuming the meat. Epidemics like those reported in Germany are unknown here, and trichiniasis in a fatal form is undoubtedly a rare disease. In the vicinity of the great pork-packing establishments near Boston, the "spare-ribs," containing the intercostal muscles, are very largely bought and eaten by the people near by; and trichiniasis among them has not in a single case been reported, so far as I have been able to learn. The cuts being thin and well cooked, any trichinæ in them are quite certain to be killed. Even when trichinæ are introduced into the intestinal canals, too, they are sometimes expelled by diarrhœa; and the invasion of the system by a small number, does no harm.—*American Microscopical Journal.*

Killing vs. Taxing Dogs.

A Kansas physician having said in the *Farmer* that many persons, including Mr. Coburn, are clamoring for a dog-tax law, the latter replied as follows: "The doctor may be right as to the other fellow, but is wholly mistaken as to myself. I am not aware of having anywhere expressed myself in favor of taxing dogs, or having the Legislature interfere with them. *I am in favor of killing the dogs!* This put in practice would settle the whole question in twenty-four hours, rid the State of an abominable nuisance that costs us millions of dollars annually to maintain, and would cause wool to be so abundant that economical farmers like myself and ten thousand others who for fifteen years have been arrayed in purple and fine cottonade, could have for Sunday a suit of all-wool jeans and some warm socks. The sheep-raiser who expects the Legislature to protect him from dogs might about as consistently demand legislature to cure him of the itch. I believe that in wool-growing, as in all other human enterprises, the gods help those who help themselves; and I have no patience with the shepherd who sits around and whines because the *law* doesn't protect his mutton. The average Kansas or Missouri dog is law-proof. Twenty-five cents' worth of strychnine judiciously used by each breeder, will give more and better protection than all the taxation and all the legislatures in America are likely to give in the next fifteen years."

Our Exchanges.

The charter of the *Kansas Farmer* Publishing Company was filed to-day. The incorporators are J. K. Hudson, W. P. Popenoe, F. D. Coburn, Dana C. Pearson, E. W. Longshore, and C. W. Price. Capital stock, $10,000.—*Capital.*

From a number of experienced orchardists who have examined their trees, we learn that full half of the peach buds are yet alive, especially on the uplands; and, unles killed by the frosts that may yet come, there will be an abundance of peaches in Wabaunsee county this season.—*Wabaunsee County News.*

The prairie fire last Sabbath, south of Big Creek, in Ogallah township, burned over a large scope of country. Several farms were partly or entirely burned off. The fire extended to the Smoky. In addition to the burning of the fine covering of grass, the accumulation of three years, Mr. Likens had about one hundred bushels of corn burned. The fire originated on section 27, township 13 south, range 22 west, and is supposed to have been set out by two or three boys who were there herding cattle. The probability is, that those who have suffered loss will prosecute the parties who set out the fire. It would be a wholesome lesson, and teach settlers to watch their children closely and prevent their carrying matches or smoking while herding cattle.—*Wa Keeney World.*

THE INDUSTRIALIST.

SATURDAY, APRIL 23, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Report on the Grasshopper.

We have received, from the Department of the Interior, the second report of the Entomological Commission, on the Rocky Mountain Locust. This report is even more complete than the first. It is the joint production of the three celebrated entomologists who compose the commission,—Professors Riley, Packard and Thomas, and several other noted naturalists. The hated grasshopper has been thoroughly investigated. From these two reports, we may learn all that is known about him.

'Tis true he may again, with the countless myriads of his race, swoop down upon us, and devour every growing plant, defoliate our trees, and consume our fruit. The weird mystery which has hitherto surrounded him, has been swept away by the patient, thorough labors of scientific men.

We have maps that show his habitat and his favorite routes of travel. We have the history both of himself and his numerous kin from the earliest times to the date of the report,— April, 1880. In the bibliography of some of the literature concerning destructive insects, we have given the titles, authors and publishers of 379 different works.

The report is profusely illustrated with microscopic drawings of every conceivable part of the body of *Caloptenus spretus*.

One chapter is devoted to the brain of the locust. It opens thus: "In order to appreciate the habits, migratory, reproductive, etc., of the locust, and to learn something of its general intelligence as an insect, and as compared with other insects, it is necessary for us to study with a good deal of care the organ of the locust's mind; *i. e.*, its nervous system, comprising its nervous centers and the nerves arising from them." Another chapter treats of the air sacs of the locusts, with a view of indicating their origin and showing their use in flight.

Dr. Charles Sedgwick Minot uses forty pages in setting forth the histology of the *Caloptenus* and the *Anabrus*.

But, with our limited space, we cannot begin to mention all that is to be found in this very learned and exhaustive report. Ten thousand copies of it have been printed, "5,000 for the use of the House, 3,000 for the use of the Senate, and 2,000 copies for the use of the Commission."

For this contribution to science, as well as for the aid received by Kansas in other directions, we are indebted to the g-hopper raid of 1874.—*Prof. Ward.*

Co-operation among Farmers.

The mechanics of England and the peasant farmers of Germany, are reaping the benefits derived from co-operative associations. The question is often asked, "How can the farmers of Kansas avail themselves of the advantages that result from co-operation for business purposes?" Those who desire to unite in such associations live miles apart. How can there be any union in business relations? There is already a union among farmers for social and educational purposes. The grange is a national institution. It has done much to unify the efforts of farmers in various directions, for their improvement. The grange has prepared its members to succeed in co-operative associations for business. Those who have been accustomed to travel several miles to meet each other in the monthly meeting of the grange, would find no difficulty in attending the business meetings of an association. Out of the grange might arise co-operative associations for distribution, or co-operative stores and co-operative associations for loaning money, like the credits-union of Germany.

To be more specific, farmers might co-operate for their pecuniary benefit in the following ways: —

First, in co-operative stores. Every prosperous farmer can take from one to twenty shares of five dollars each in a co-operative store. The few hundreds or thousands, as the case may be, which these small sums would aggregate, should be invested in merchandise in general demand. In other words, every farmer who can adopt the pay-as-you-go principle, can become his own storekeeper, and thus save for himself the profits made on the groceries, clothing, and agricultural implements he purchases.

In co-operative stores, the farmer shares double profits. He shares in the profits made on the butter, eggs and chickens which he sells, and on the groceries and dry goods which he buys. The marketing of grain and stock could be included in the business of the farmers' co-operative store.

Second, farmers could co-operate in the purchase and use of expensive agricultural implements, such as reapers, threshers, ditching plows, etc., etc.

Third, farmers could co-operate in improving their stock. An association could purchase a better class of thorough-bred animals than individuals usually can afford to buy. Provision could be made for the care and keeping of these animals. The usual rates for service should be paid. At stated periods, the profits could be divided, or the losses assessed.

Fourth, farmers might unite their credit, and thus secure the same advantages in borrowing money as the stockholders of a bank possess. They could procure money when they need it at the lowest rates of interest, and thus save from two to five per cent on the interest which they usually pay. The maximum amount the association might borrow should be fixed, and this sum be divided among the members, according to the value of the real estate pledged by each member to secure the whole. The details of such an association would be similar to those of the credits-union of Germany.

Fifth, farmers could co-operate in the destruction of noxious plants, destructive animals, and insects injurious to vegetation. Without co-operation intelligently and systematically applied, but little can be done in this direction.

If the conditions which have made co-operation a success in Europe, are complied with, we see no reason why co-operative associations for business may not be as beneficial to the farmers of Kansas as they have been to the weavers of Rochdale, or to the peasant farmers and artisans of Germany.—*Prof. Ward.*

The Roads.

During the last winter, the frost penetrated the ground to an unusual depth; and it was a long time in coming out. This and an occasional fall of snow kept the roads in a very bad condition for work. Farmers were obliged to double their teams to haul ordinary loads. The mud has mostly disappeared, but the roads are still very rough. We have never seen, at this time of the year, the roads in a worse condition than they are at present. And this suggests the question, Are the roads of Kansas improving? Where do we find the best roads? in the newly settled portions of the State, or in those portions where the farms are fenced, and the travel is restricted to the legal limit of the roadbed,— 30 to 80 feet? In the matter of bridges, the roads in older portions of the State are superior; but, in the general character of the roadbed, they will not rank with the new roads just opened.

The natural roads of Kansas are remarkably fine. The unbroken sod of the prairie is smooth and level as a floor; but, as a roadbed, it is not durable. When it is moist, a train of heavy laden wagons cuts it.

In early times, as soon as one track was worn another was taken. Some of the old trails are twenty rods in width. When the travel is restricted to the legal limits, the roadbed soon wears out in most places. The soil beneath the sod is very friable to a great depth. This renders it liable to wash wherever there is an incline. In a few years, the center of the road in such places becomes a deep ditch: the track then hugs the fence or hedge, first on one side, then on the other. It is not an uncommon thing to find ditches in the center of the roadbed several feet deep, constantly growing deeper and broader. When the road becomes nearly impassable, the loose soil is thrown in, and the roadbed leveled the whole width, for the whole length of the incline. The water is not turned off, and the roadbed becomes cut up again. In low places, where there is no drainage, the road soon becomes a quagmire. From time to time, such places are fixed, the dirt being thrown up only a few inches above the level. After a rain, the water stands in the ditches on both sides of the track, which is soon broken down, to be fixed in the same way the next year. It has been our experience to find the worst roads where we had expected good ones. We have wallowed through the Wakarusa bottom just south of Lawrence, and have floundered over the hills in the vicinity of Manhattan. It is our opinion that the roads of Kansas will become worse and worse the more they are used, so long as the present system of management continues.

Our roads are like the old darky's house. When it was fair weather, it needed no fixing; when it rained, he couldn't fix it. Our climate is so fine, and our soil so free from all impediments, that, for the greater part of the year, there are long stretches of road, for miles and miles, as good as can be found anywhere. To bridge the streams, or to prepare approaches for the ferries, seems all that is necessary. The few bad places described above are fixed every spring, so that they are made passable, and the road is left for the remainder of the year, good enough when the ground is dry, bad enough when it is wet, and in no condition to be repaired. During all these months, while the roads are left without any care, little by little the summer showers are washing down the inclines, the southern zephyrs are sweeping off the pulverized embankments in the "low places," every load hauled over the bad places is making them worse; and, when the road overseer, the next spring or fall, summons his forces for the annual repair of the highway, it is found to be in a worse condition than ever before, especially after a winter like the last. The worst places are repaired, and the road is left as before, with little or no supervision for another year. Thus it goes on from year to year; and our roads are becoming no better, except in matter of bridges.

It would seem that, in the more thickly settled portions of the State, the poll-tax of two days' labor, or $3 in money, on every man between the ages of 21 and 45, and the three-mill property tax, ought to keep the highways in fair condition, after the larger streams are bridged. But this is not done, as a rule: first, because honest, full days' work are not always given, by men who work out their poll-tax; second, because, by frequent change of overseers, the work is not always systematically and judiciously expended; third, because the supervision of the roads is not continuous. As the law now stands, a road overseer cannot receive pay for over fifteen days' labor and supervision in one year. This law should be repealed. "Eternal vigilance" is the price that must be paid for good roads in Kansas. A few hours' work at the right time in turning the water from the track, or in opening, would save days of hard labor a year afterward. With constant supervision, and with the present amount of labor judiciously expended, we ought to have excellent roads.—*Prof. Ward.*

Educational Gossip.

The total enrollment in the public schools in Kansas City is 7,794. In the ward schools there are 187 classes, and in the high school 42 classes.

The Linn county normal institute will be conducted by Prof. G. W. Botkin, of La Cygne. We understand the Professor will also have charge of the next normal at Independence, Montgomery county.

The State Reform School building will hold about 150 pupils; but the appropriation made by the Legislature is not sufficient for the maintenance of more than half of that number. It will be opened about June 1st.

The Anderson county normal institute will commence August 8th, and will continue four weeks. Prof. Harris, of Iola, a man of acknowledged ability and long experience, has been secured as conductor. Mr. Harris will be assisted by Mr. W. J. Brinkley and Miss Nannie Hunter.

It has been customary to close the annual summer session of the State Teachers' Association by an excursion. Will there be one this summer? As far as we are concerned, it makes no difference, for we could not afford it, at a cost of one dollar: but there is occasionally a pedagogue in Kansas that has had a chance to take a homestead in early days, and raises wheat and hogs as a side issue; and there are those that have rich uncles. Give them a chance.

The Washington *Republican* complains: "Our schools are in a very demoralized condition, the result, we presume, of the conversation the children have overheard while parents and others have commented on the late action of the principal and the school board. It has been a general remark on the street and in the home circles, for the past two weeks, that Mr. Haines has lost all power of usefulness in our schools, and that the board may as well declare another vacation. This state of affairs is certainly to be deplored; but the sooner the board recognize the fact, the better it will be for the schools.

The Kansas City *Journal*, in a lengthy discussion of certain results and their causes, says: "Sometimes the question is asked, Why is it that the best educational men retire from that work and go into other business? The answer is plain and simple. It does not pay. Hence it is that the best talent is rarely found in this work. There are a few able men engaged in educational work, not so much for the pecuniary recompense, but because they are deeply imbued with the necessity that exists for educating the entire masses of the people; but, so far as the salary as such is concerned, it cuts an insignificant figure.

Dr. Boyakin, sup't of Marshall county, publishes the following interesting article in the Marysville *News*: "The school laws of Kansas require that the teachers shall teach and govern the school. If, to the proper government of the school, corporal punishment becomes necessary, the teacher is constructively by the law justified to inflict it. I would advise moral and persuasive means until the pupil becomes too refractory, then try your 'birch remedy' pretty freely. Not long since, I visited one of the best schools in the county. 'Madam, said I, 'your school is well ordered; your government is fine. What is the secret of your success in that way?' 'I tell them what I expect of them,' she replied, 'and then, if they don't obey, I give them what I call a good dose of birch oil.'"

THE INDUSTRIALIST.

SATURDAY, APRIL 23, 1881.

The work of excavating for the main building was commenced on Wednesday, the 20th.

Prof. Ward gives his excellent lecture on Co-operation, before Manhattan Grange this afternoon.

Our tame grass pastures now furnish full feed of the best quality. Those who turn up their noses at the tame grasses will please make a note of this fact.

On account of sickness, Prof. Popenoe was prevented from taking the stand yesterday as Friday-afternoon lecturer. The hour was occupied by President Fairchild, who gave an able lecture on "The Poet's Place."

We notice that General Ross' excellent address on "The North Devons," delivered at the Breeders' Institute, held in Manhattan last winter, has been published in pamphlet form, by Butterworth & Co., of the *Western Agriculturist*, Quincy, Illinois.

The past week has witnessed a large number of trees—chiefly red cedars and other natives—set out. A neat double terrace, in front of the east end of Societies' Hall, has been completed, including sodding; seventeen acres of oats have been put in; and much other work too tedious to detail has been done.

The INDUSTRIALIST has been a little off time of late; but, if any one supposes that the Printing Department is resting on its oars, let him "drop in," and, if you can find any one who will squander the time on you, inquire into the matter. The facts are that, in addition to class-work and the weekly publication of the INDUSTRIALIST, a 2,500 edition of the catalogue is being printed, to say nothing of blanks, letter heads, etc., etc.

On Tuesday we obtained from Commissioner Long the carp with which to stock the new fish-pond. There may have been fifty or two hundred of these small fry, but which we cannot say. It is an easier task to count three flocks of sheep going in different directions in the same yard, than to enumerate a double handful of small fishes in two gallons of water. The little fellows took kindly to the "drink," as well as to the solid nutriment, in the shape of bread and potatoes, furnished them.

In the advertising columns of this issue of the INDUSTRIALIST, Mr. J. C. Stone, jr., of Leavenworth, offers, at private sale, a number of choice young Short-horn bulls, which, on account of breeding and individual merit, deserve the attention of all those interested in this noble race of cattle. The breeding of this herd deserves particular mention, inasmuch as it includes Princesses and Peris of the highest breeding, to say nothing of those sterling sorts,—Young Marys and Young Phyllises. We are assured by those who have examined these young bulls that they are a very superior lot. Catalogues, and information that can be relied upon, may be obtained of J. C. Stone, jr., Leavenworth, Kansas.

SOCIETY HALL, April 22d, 1881.

Society called to order by President. After the usual opening exercises, the debate was listened to with interest. The *Gleaner* was presented by Mr. Griffing and Miss Cowell, both divisions of which were well provided and entertaining. The debaters for next week on the affirmative are, Messrs. Helmick and Lund; on the negative, Messrs. Deitz and Willard. Essay by Miss Mason; select reading by Mr. Platt; declamation by Miss Cora Long. The committee on the selection of books for the library, offered a list of fourteen volumes of standard works, which were accepted by the Society; and the directors were ordered to purchase the same. H. B. L.

SOCIETY HALL, April 16th, 1881.

Webster Society convened at the usual hour, with President Mason in the chair. After usual order of exercises, followed the debate on the question, "*Resolved*, That wealth is a greater controlling power than talent." Decided in favor of the affirmative. Extemporaneous speaking was passed; and, at the request of the Society, Dr. W. S. Williston, a brother Webster and a graduate of this College, favored us with a few interesting and well-directed remarks. Mr. Williston will deliver a lecture before the Society next Saturday night, April 23d. His subject is, "Some Fossil Wonders of America." This lecture will be free, and everybody is invited. After a short recess, followed the orders of declamation, composition, and select reading. Article 13 of Constitution and By-laws was amended by striking out the clause referring to the examination of candidates for admission. Report of critic and reading of minutes. Society adjourned. ST. AUGUSTINE.

ENTERPRISE ITEMS.

It is reported that Dr. Williston intends locating either in this city or in Topeka.

Ex-Gov. Green has moved into Geo. Brown's residence, just outside the city limits.

The front of Johnston's drug store is all torn out, awaiting the progress of the workmen.

Will Brous came in from the west Saturday evening, and left the next day. He is off on another geological-specimen tour.

The freight train, Wednesday afternoon, brought in four fine brood mares, one young stallion, and one thoroughbred bull, for Gen. Casement.

We have interviewed nearly every dealer in intoxicating liquors in the city; and they announce their intention of closing out by the first of May. Mr. Tegmeire closed out last Saturday.

Daniel Walters, six miles south of Riley Center, has sold his farm, and has purchased the Cole farm, a short distance east. It is one of the finest high-prairie farms in the county. Mr. Walters is father of Prof. Walters, of the Agricultural College.

THE SPRING TERM.

The winter term of twelve weeks closes with examinations on Friday, March 25th. The spring term begins on Monday, March 28th, and closes with commencement exercises, on Wednesday, June 8th. Students already in the regular course find this term quite essential to their successful progress. Those about to enter will need better preparation than was required for the previous terms of the year. Examination for entering includes Reading, Spelling, Writing, Geography, Arithmetic, and the elements of English Grammar. Classes will recite on the first day of the term, and new students arrange to begin, if possible, with the classes.

The following branches will be taught in classes arranged with reference to general advancement of students:—

First Year.—Algebra. English Composition. Botany, with Drawing. English Drill. U. S. History. Book-keeping.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—U. S. Constitution. Political Economy. Agricultural Chemistry.

Students are admitted to such studies as they are able to pursue to advantage, though advised to follow essentially the regular course, so far as they can. Drawing, music, and the various industrial arts named elsewhere, are so arranged as to accommodate students of all grades of advancement.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument,	$1.00
Private lessons, 1 a week, on any instrument,	.60
Class lessons, 2 a week, on any instrument,	.65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL CQURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil, climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

Historical Society

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, APRIL 30, 1881. No. 37.

KANSAS STATE AGRICULTURAL COLLEGE.

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COLLEGE BUSINESS.

THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

"Electricity" Nonsense and Humbug.

The aggregate amount of imposition, petty swindling, and larger humbuggery, now practiced, based upon "electricity," magnetism, galvanism, etc., is incredible to any one who has not watched the general newspaper advertising, and collected an assortment of a class of circulars now being daily distributed throughout the country by the ton, in the mails, from drug stores, shops, and in various other ways. There are now heralded electric, magnetic, or galvanic bands, batteries, belts, and brushes, pills, potions, and lotions in infinite form and variety; while "electrical doctors" rival Egyptian frogs in number. As the enormous expense of all the above is kept up continuously, there must be an immense number of people gulled into paying the tax on their credulity—often at the sacrifice of the comforts and even necessities of daily life.

There is some satisfaction in the fact that most of these mechanical contrivances sold, are in themselves positively inert and useless, and therefore not injurious, while imaginatively sick people, and others with slight nervous disorders, are soothed and comforted, and sometimes actually cured, through their belief in the efficacy of the otherwise useless nostrums. Take an illustration. We know a person in good position, of more than ordinary intelligence on most other subjects, who positively believes himself benefited by a large horse-chestnut always carried in his pocket. To lose this, and be unable to get another, would give him the blues, if not bring on a spell of actual sickness. Another person of like intelligence has equal faith in a combination of copper and zinc, the size of a silver dollar, worn suspended from the neck, and called an "electric battery," though having no more electrical or galvanic or magnetic effect than so much silver, iron, stone, or wood; that is, no effect at all, save upon the imagination. * * *

Galvanic electricity is set in motion by chemical action, and magnetic electricity by the motion of permanent magnets in a manner to have opposite poles pass each other with great rapidity. Either chemical or mechanical action, kept up, is necessary to the continuous development of electricity. This electricity may, by proper arrangement, be passed through the entire system, or any portion of it, and it may be useful in certain cases, or it may have a directly opposite effect. Only an intelligent physician, on the spot to examine the patient and apply the electricity in the proper manner, can decide as to its uesefulness or injury.

The entire class of fixed combinations of metals of whatever kind,—whether offered by Boyd, Elias, or any one else; whether called "electric," "galvanic," or "magnetic;" whether of American or foreign origin; whether large or small; whether round or oblong, or any other shape; whether ornamented with embossed figures of devils or angels, with the flames of hades or the lightnings of heaven,—are all, in reality, just as useful "electrically," "magnetically," or "galvanically" as so much plain copper or lead, or zinc, or silver,—except as they operate upon one's faith through the preposterous claims put forth for them in the enterprising sellers' advertisements. This faith is so strong in many people that it is even safe for the dealers to promise to "return the money," if the purchaser does not find benefit; albeit it is easier in most cases to pay money than to get it back for "guaranteed" medicines and the like. The man who has got your money by ingenuity will be ingenious enough to worry you out with pretenses that "it was not used according to directions," or some other subterfuge. —*American Agriculturist.*

Sheep in Kansas.

A sheet giving a description of the lands of the Atchison, Topeka and Santa Fe Railroad, has just been issued by that company, giving a map of the State of Kansas. Of sheep-raising in this State, it is said that the fact that over 300,000 have been added to the sheep population of Kansas in the year 1880, is evidence of the great interest taken in this industry in Kansas. Over half of this increase has been made in southwestern Kansas alone, where there are now over 200,000 head, as against about 50,000 in 1879. Two causes have contributed to this: one, the natural excellence of the country itself, its favorable location, its elevation, its pure atmosphere, its comparatively dry winters, its well-drained soil, its abundant supply of nutritious buffalo and gramma grasses and cheap winter feed, and the general success of those engaged in the business there for the past five years; the other, the failure of the grasses along the base of the Rocky Mountains during the drouth of 1880, forcing sheepmen to seek the more reliable pastures of southwestern Kansas. Over 250,000 head of sheep were driven into Kansas from Colorado and New Mexico alone, during the year 1880. Many of these, however, were driven in on account of the great demand for them along the Arkansas valley, and the consequently better market for disposing of surplus stock. New York State has made large contributions to the sheep wealth of southwestern Kansas during the past year, more especially of thoroughbred rams, to cross with the native sheep from the West.—*Spirit of Kansas.*

Polled Angus Cattle.

In reply to Mr. Redfield, in the March number, on this subject, I wish to state that I visited Scotland in the summer of 1867, and saw many black polled cattle then, which brings my personal knowledge of them down twenty years later than those I mentioned having seen in 1841. None can admire or think more highly of these cattle than I do, as all can bear witness who read the numerous articles I have written in their favor, as I might say, for over forty years past, but especially such as have been published in various agricultural journals from my pen for nine years past, all the way from New York to Colorado. I have also written repeated articles for the British papers. When I first heard of the late Mr. Grant's extensive purchase of land in Kansas, I wrote him strongly urging him to stock it largely with his own native polled cattle; for he was a Scotchman,— by birth, at least,—I am informed. I have no doubt polled cattle of good breeds can be reared ten per cent cheaper than horned breeds; and then how much greater the comfort in handling them! They can also be transported much cheaper and more safely, and with less injury to each other, to market.—*A. B. Allen, in Live-Stock Journal.*

While a car was being loaded with wheat out of the elevator at Nortonville, last Tuesday, Ben Lawson, a boy about twelve years old, and son of W. L. Lawson, accompanied by another boy, ascended to the bin from which the wheat was being taken. During this process, with playful intent, Ben would let himself down into the sinking wheat and then draw out, supporting himself by the cross ties inside of the bin. His hold must have finally slipped and he was carried to the bottom. The first discovery was the wheat ceased running, and Messrs. Johanner and McCoy, who attended the elevator, on looking around to find the cause, discovered the boy's feet partially through the shoot. When extricated, he was lifeless.—*Valley Falls New Era.*

Our Exchanges.

The Solomon *Sentinel* says that the National Solar Salt Works at that place, will be completed by the first of May.

Chase is fast becoming a sheep-raising county; and a more advantageous point for a woolen mill could not well be selected.—*Chase County Courant.*

Thos. Donahoe, of this city, has the contract for repairing the damage done the Waterville bridge by the late flood. The *Telegraph* says the contract, as it now stands, will cost the township $350. The west-side pier is to be built up solid, and the stone laid in cement.—*Blue Rapids Times.*

J. Wilson had five head of cattle stray up into Kingman county, near Kalamazoo post-office; and, when he went after them, was required to pay forty dollars before he could get possession of his property. This species of robbery is practiced regularly by our herd-law neighbors.—*Medicine Lodge Cresset.*

We noticed a farmer's wagon with a cord or more of peanuts, in two-bushel sacks, piled up as high as they could lay on, standing on the street last Saturday. He was selling them for fifty cents per bushel. The cultivation of peanuts is peculiarly adapted to our soil, and could be made quite profitable.—*Great Bend Democrat.*

A significant but melancholy comment on the value of the work actually accomplished by the much-valued Boston schools, is found in the fact that a prominent lawyer who wished a copyist recently, was forced to reject a large number of applicants who had graduated from our high school; for the simple reason that not one of them could spell common words, even tolerably.—*Boston Courier.*

The hoop-skirt is coming into fashion again; and ten years hence the man who digs gardens will feel the need of some new and wicked-looking words with which to express himself when he strikes one of these profanity-provoking outcasts about four inches under the ground. Nothing demoralizes a gardener more, unless it may be when his spade strikes a piece of old rag carpet.—*Leavenworth Times.*

The Kansas Freedmen's Association, we are permitted to authoritatively state, is closing up business as rapidly as possible. A committee, consisting of T. A. Reck, John D. Knox and John M. Brown, has been appointed to receive all monies and donations of clothing, to pay all bills, and settle with John M. Brown for his services. The latter will, we understand, devote his time, in company with Mrs. Comstock, to working up a national association, with headquarters at Cairo, Ill.—*North Topeka Times.*

New England is becoming a great criminal curiosity-shop. The latest addition to the list of unique crimes is the burglary, near North Andover, by two esteemed students of Philips Academy, who were "industrious and frugal, 'saving their earnings in order to secure an education,'" and who were in the act of adding to their assets from another's property when they were surprised, and one was shot dead. Here is a good study for experts in sociology. These fellows were twenty-one years old (twins—did that have anything to do with the affair?), reared in a respected family, under the very shadow of the Andover Theological Seminary, and were pursuing the higher education in a Christian school famed for its thoroughness. They could no doubt have got help from some of the many funds devoted to such objects; and yet they stole. What does it all mean? The solution of a few problems like this would be worth more to the world than all its divinity schools and theological libraries.—*Leavenworth Times.*

THE INDUSTRIALIST.

SATURDAY, APRIL 30, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

The Kansas Academy.

We are in receipt of a copy of "The Transactions of the Kansas Academy of Science," for 1879–80, and find many interesting papers in it. Considerable credit is due to the worthy secretary for the editorial skill that he exhibits in the neat arrangement of this report. One of the most interesting papers contained in it is "An excursion to the birthplace of the Montezumas," by Col. Theo. S. Case, of the Kansas City *Review*, which paper we think adds considerably to our knowledge of the prehistoric races that once inhabited this country. In speaking of the many theories which find a popular credence as to the cause of the depopulation of New Mexico and adjacent territory, the Colonel makes a remark which strikes us forcibly. We quote: "It seems unquestionable that some vast change took place in the geological and physical condition of the country, causing its fountains to dry up, and changing its fertile valleys to arid wastes, thus literally starving the people out, and forcing them to find new homes. This idea brings to the front the theory of the continent of Atlantis, * * * * a theory which, if established, will enable us to account for the migrations of ancient peoples from one continent to another, without taxing our credulity with the extremely doubtful one of the Behring's Strait route." The evidence seems conclusive that this country once supported a dense population; and, in explanation of its present state, we think the above theory the only tenable one.

Mr. Case cites authorities to prove that the pre-Aztecs, or Toltecs, were identical with the Mound Builders of the United States; and that they "bear so distinctly an Asiatic stamp as to point to the Mongaloid regions of the Old World as the home of their remote ancestors." The paper gives a discription of antique ruins found on the Pecos river.

The report of the Academy contains a number of technical papers upon the natural history of Kansas, a theme which cannot fail to be of greater or less interest to the people of the State.

The insects of this and adjoining States receive a good deal of attention by the members of the Academy. We know of no country affording so great a variety, all things considered, of insects as does the State of Kansas; and many of them are of considerable importance to every person in the State. Prof. F. H. Snow, of the State University, takes the lead with quite comprehensive lists of several orders of insects found in this and adjoining States, including many new species.

These papers, together with his meteorological summary and the "Magnetic Declination in Kansas for October, 1880," by Prof. H. S. S. Smith, of the University; "Kansas Minerals," by the late Prof. Mudge, of Manhattan; "Botanical Notes," by B. B. Smyth, of Great Bend, and J. H. Carruth, of Lawrence; "Ornithology of Riley county, Kansas," by Dr. C. P. Blachly, Manhattan; and the "Preliminary Catalogue of Kansas Reptiles and Batrachian," by F. W. Cragin, of Cambridge, Mass.,—are especially valuable as matters of reference to the student of natural history.

Perhaps the papers of most general interest to the inhabitants of western Kansas are, Judge F. G. Adams' "Irrigation in Kansas," and Mr. H. R. Hilton's "Rainfall in its relation to Kansas farming." Judge Adams, in his paper, shows that irrigation has been made practicable in Kansas, in some cases, without the aid of science in any great degree, and thinks that science may be made to help in carrying forward this work which has been begun without its intervention. One instance mentioned is, "that there is abundant testimony to the fact that a patch of sweet potatoes, the plants for which were raised in the open ground, with no hot-bed of any sort, and which were set out in July, yielded nearly a thousand bushels to the acre." This occurred out in "the Great American Desert," in the Arkansas Valley. The paper compares the Kansas experiments with works of irrigation in other countries, showing that, had the knowledge gained by practical work of this kind elsewhere been utilized here, the results might have been more satisfactory. Mr. Hilton finds that the soil of Kansas changes gradually from east to west; *i. e.*, "in eastern Kansas, the soil is a black loam, resting on a clay formation; the soil of central Kansas is a dark sandy loam, resting on a porous marl clay; while that of the western portions of the State is still more sandy, and the subsoil more porous. As a rule, the surface soil grows deeper and the subsoil more porous as we pass from the east to west."

As the rainfall is graduated in the same direction and with the same regularity as the soil, and as the soil of western Kansas is capable of retaining all the moisture it receives, while that of the eastern part of the State rejects a great portion of the moisture received for want of capacity to hold it, it follows that the amount of rain which falls on the western lands would be much too great for the eastern soil, and *vice versa*. The last two papers seem to point to solutions of several vexatious questions, and should be read by all.—*Sup't Graham.*

College Work.

The drift of thinking for the past twenty years has been toward a clearer understanding of the use of education in the various arts of life. Experiments in industrial education have gone all about the subject; and theorizers still have their own way, in rambling debate, over the impracticability of of such effort. But there are a few facts, established by experience, which show what such institutions ought to do

FOR FARMERS' SONS AND DAUGHTERS.

Of course, the first idea in every thought of a college is education of youth. Whatever else it may do in the way of discovery of truth or dissemination of facts, must be second to this, and made to add to its means of education. If the sons and daughters of farmers are not of first importance in the college, it should be called by another name. But they are first; and the capable men and women of sense and knowledge,—such as ought to pass from these colleges to the farms and households,—must be the chief means of a better and more profitable agriculture. It is thought carried into these every-day callings that makes of them the true arts, and directs all the labor to profit of those who toil.

These colleges, then, can stimulate youth to energetic thinking in line with their life-work. For this end, the course of study and training keeps their minds busy with the nature of materials upon which they work. Plants and their development from seeds become lessons in direct observation of the nature by whose influence they raise their crops. To "know beans" has been the test of common sense for ages; but the thoughtful observation that distinguishes beans from beans, is just as necessary to a further progress in clear-headed energy. If the temper of such a college is right, all the studies gain their interest from the constant turning of the students' thoughts upon the life with which they are most familiar. The broader field for comparison afforded by their general information, enables them to think more earnestly and exactly. Young men are every year going out from these colleges to become leaders in agricultural and horticultural circles, widening with every increase of acquaintance and experience, because they think their way forward. Such men do not bring science into disrepute by an effort to farm by so-called scientific *rules;* for they know that science gives only general principles by which clear-headed observation can obtain practical rules of action.

INFORMATION.

Such an institution must also serve its purpose by furnishing a fund of information suitable for use in its course of training, and available in practice. The very studies have to be fully up with the times. The professors hold their place as successful teachers, only as their researches keep them in the front rank of well-informed students of their special sciences. Their laboratory illustrations must all be chosen with care, to give most insight into the truths they illustrate. But this does not make them able to be mere news gatherers in the statistics of an art which they foster. Their first business is teaching the principles of which statistics furnish illustrations, and, in some measure, the basis of investigation. But the full investigation needed for best teaching requires

EXPERIMENT.

How much or little of this work can be done by these colleges, depends upon means and opportunity. Usually, the demand is all-embracing, and the means very limited. Naturally, since the first work is teaching, the chief efforts in experiment must be to establish principles, and enforce them. These are sometimes looked upon as out of the line of practical work, because of the peculiar circumstances of hot-house or laboratory, plotted field or feeding-pen, which confine the questions to simple elements. We must not forget that the complications of ordinary practice prevent any very exact experiments, and our first object must be to simplify surroundings. This we do in regulating variations, and bringing all as much under our control as possible.

That a college should push on into field experiment for practical rules, nobody doubts; but this work will move faster if its best energies are kept constantly fresh by contact with minds to be taught. So the practical training of students in the arts, gives room for best education in principles that will hold through all practice, and demands the first energies of the College forces.—*President Fairchild.*

Mound Builders.

Since the organization of the Scientific Club of this institution, a little more than a year ago, a great deal of field-work has been done by its members. The Club is divided into sections, corresponding in name with the several sciences which it proposes particularly to study. Of these sections, that of archæology has been especially busy of late, with the labor of opening some of the many mounds found in this vicinity, which were left by that mysterious, prehistoric people commonly known as Mound Builders.

As these mounds furnish all the attainable data from which we can hope for a knowledge, however meagre, of the manners and customs of this people without a history, the results of these explorations are worthy of note. Perhaps the most noticeable fact that has been developed by the work of the Club, is the marked dissimilarity existing between mounds and their contents which are located upon high bluff land and those found in creek bottoms. Of the twenty-seven mounds opened by members of the Club, nine were found on bottom land and eighteen on bluff. The difference between these mounds, which for convenience we will call bluff and bottom mounds, will be more readily seen after a brief description has been given.

The bottom mounds vary in height from an almost imperceptible elevation to one and one-half feet above the general surface. They all contained charcoal, some of which was still attached to unburned wood. This charcoal is often in such condition that the kind of wood from which it was produced, is easily identified: oak, elm, and willow were found. They also contained a great deal of pottery, or earthen vessels, generally in fragments, all of which had the same general form, and range in capacity from a half pint to a half bushel. This pottery usually has the "grass marks" upon the body of the vessels, and on their rims a slight effort at ornamentation; but they are not otherwise marked, except in a few cases where rude attempts at drawing the outlines of animals, were made upon the body of the vessel. They all have rounded bottoms: and a few of the smaller ones have handles, or lugs; but the large ones have none.

The fire-places or ovens, mortars for grinding corn, and the animal bones, some of which are charred, found in these bottom mounds, would seem to indicate that they were places of residence for some length of time; while the large numbers of flint chips, together with arrowheads, stone axes, whetstones of Dakota sandstone, and flint knives, found, would imply a workshop as well.

These arrowheads differ from those of the bluff mounds, in their larger size, in having smooth margins, and in seldom being notched at the base. Those found in the bluff mounds are small, measuring from one-half to one and one-half inches in length, and are very beautifully formed. They are always notched at the base and have deeply serrated margins. One of the bottom mounds proved an exception to the rule, and is, so far as we know, unique in that it contained human bones. This is the only instance of the kind yet discovered. In another was found a mud-wasp's nest which, with its contents, had been baked before being buried.

The bluff mounds are from one to four feet in height; and are always burial places, having a greater or less quantity of partially burned human bones in them. This shows the custom of cremating the dead. Often two or more skeletons are found in a single mound, in positions which seem to prove that the burial of the second or later body, took place after the original mound had been completed. These mounds contain, in addition to human bodies, flint arrowheads; bone daggers, fish-hooks, and beads; pottery; and in one was found a portion of a copper bracelet. The discovery of this copper ornament is, we believe, the only instance of copper being found in any Mound Builder's mound in Kansas.

The bluff pottery has not the "grass marks" which usually appear upon that found in the bottoms; and it is always, and often very finely, ornamented. The bone daggers are from six to twelve inches in length, and are made from the bones of some large animal. The joint end of the bone forms the butt end of the handle. The "grip" is marked somewhat like that of a modern gunstock.

In studying the results of these excavations, two theories present themselves: first, that the bluff and bottom mounds were made by two distinct races of people, who lived in this country at different periods, and whose manners and customs differed from each other; or, second, that all these mounds were built by one race, and that this race manufactured one kind of pottery for economic purposes and another for cinerary urns, or some similar use, and which latter they buried with their dead; also that they made one kind of arrowheads for use in killing game and another kind which is always found only in burial mounds, for warlike purposes or for burial as mementoes with the dead. But the fact that nothing found in one class of mounds is ever found in the other, seems to support the first theory.

As the work of the Club, in this direction, progresses, we hope to be able to determine whether these mounds were the work of two different peoples, and, if they were, which was the older; and, to accomplish this, we invite the co-operation of any one feeling an interest in the "oldest inhabitant."—*Sup't Graham.*

Educational Gossip.

The Ellis *Headlight* has a young schoolma'am for an editor.

The Concordia *Blade* of last week published a very full history of Cloud county.

The Davis county institute will be held in July. Professor Robert Hay is to be the conductor.

The Emporia Musical Union has arranged the cast for a new opera, Olivette, which will be rendered in the course of about a month.

Prof. B. T. Davis, of the Normal School, has been employed to conduct the Labette county teachers' institute, during the coming summer.

At a recent examination of teachers, at Washington, conducted under the new law, out of 29 applicants, eleven received no certificate. There were seven second, and eleven third grades granted.

The new $10,000 brick school-house at Washington is approaching completion. It is a handsome structure, and reflects great credit upon the enterprising town. It is among the largest school-houses in northwestern Kansas, and will be roomy enough to accommodate the increasing school population for several years.

The Sumner County *Press* is a little off in saying: "Twenty-one years ago this month, a steamboat ascended the Kaw River as far as Topeka. The venture has never been repeated." In territorial days, steamboats have repeatedly ascended the Kaw as far as Manhattan and Fort Riley. The lumber for our College building on the upper farm, was brought to the mouth of the Blue on a steamer.

THE INDUSTRIALIST.

SATURDAY, APRIL 30, 1881.

Another invigorating though not heavy shower, simply a "fine rain," fell last night.

About nine acres have, this spring, been seeded to the tame grasses, mostly orchard-grass.

The weather, during the week, has been very favorable to the wheat crop; and the change in the appearance of the crop has been quite marked.

The regular "monthly" examinations were held in all the classes yesterday. This is the last examination before the final one at the close of the year.

The fruit trees, particularly apple, plum and cherry, are a mass of bloom; and even the peach trees, which have been pronounced dead to the root, show a liberal sprinkling of bloom.

A stranger visiting the College during the week, remarked, "I have no trouble in finding the College: it's the greenest spot on the line of the Kansas Pacific Railroad." The tame grasses do it.

The quarterly report of the Secretary of the State Board of Agriculture is received. This report contains a large amount of valuable statistical information. The report contains also an article on the "Tame Grasses," by the Managing Editor of this paper.

We are under obligations to Judge Adams, the efficient Secretary of the State Historical Society, for a bound volume containing the first and second biennial reports of the transactions of the Society. The volume before us is a valuable one, and shows pretty conclusively that the State Historical Society is one of our most useful institutions.

Our lawns, fields and pastures are literally covered with young clover plants. Over large spaces, the young plants are so numerous as to crowd each other, and almost entirely cover the ground. This is, however, by no means an unusual experience; and we are decidedly of the opinion that the Kansas farmer who once gets a stand of clover, will be able to keep it as long as he lives.

What ails that town-clock? For systematic and successful dodging, that clock beats any member of the Legislature we have heard of. We have known as many as fifteen repeaters and chronometers, gold and silver, open-faced and hunting-cased, to be turned, at the same time, on that regulator of siderial motion; but within an hour it could manage to differ from them all, anywhere from five to fifteen minutes.

When the newspaper business was free, and unfettered by foolish sumptuary regulations, we used, at this season of the year, to clip from our exchanges, savory items something as follows: "Mr. Smith yesterday brought into our office a stalk of rye measuring —— inches." But, since the passage of the prohibitory amendment, we shall get no more of these valuable facts. The editor will have no further use for the straws.

Dr. L. McLean, a veterinary surgeon, who has spent some weeks in investigating the contagious diseases of domestic animals in the West, in the interest of the National Department of Agriculture, visited the College on Thursday and Friday; and, with members of the Faculty, has visited herds in the neighborhood, giving in many cases valuable veterinary counsel. The Doctor reports the cattle of the State generally in very healthy condition, but very thin from the short feed and the severe winter. That imaginary disease, the "hollow horn," seems to have given place this spring to an abysmal hollow in the gastric region.

We have put down a good deal of blue-grass sod this season, upon terraces and lawns, and are satisfied that the work has been very succcessful. Our aim has been, first, to put the sod upon mellow, rich soil; and, if this is clayey in composition, so much the better. Press the sods close together, leaving no air spaces between them, and pack the sod by pounding and stamping as solid and close to the ground as possible. This last is a vital matter, and more depends upon it than upon any other one thing connected with sodding. After the sod has been put down, sprinkle over it a light coating of mellow earth, which should be raked in so as to fill perfectly all the little interspaces of the sod.

Dr. Wendell Williston, under the auspices of the Webster Society, gave a very interesting and instructive lecture, in the chapel, on Saturday evening. Subject, "Some fossil wonders of America." Truly, some of the creatures shown by the Doctor were "wonders" enough. For example: a few years, or a few millions, ago,—it matters not which,—there was a kind of live stock in this country which measured twenty to forty feet in height and sixty to eighty in length, and weighed not less than forty tons. Again, there were birds with teeth and solid bones, and reptiles with wings; and one delightful creature was shown whose brain was located between its hips, the true brain being so small that it could be drawn through the spinal canal. This last fact seems to us to furnish our political writers, and those engaged in newspaper controversies, a very valuable and pointed comparison.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student; its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

A singing class is taught by one of the Professors; and singing, is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere: —

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*— History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.— General principles governing the development of domestic animals. The laws of heredity of disease,— of normal, abnormal and acquired characters; atavism; correlation in the deve opment of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*— The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,— in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,— variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain.— observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.— Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.— One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,— is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY— Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.— The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*— The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,— roots, stems, prefixes and suffixes,— associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.— A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.- The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.— The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.— To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,— marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.— The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

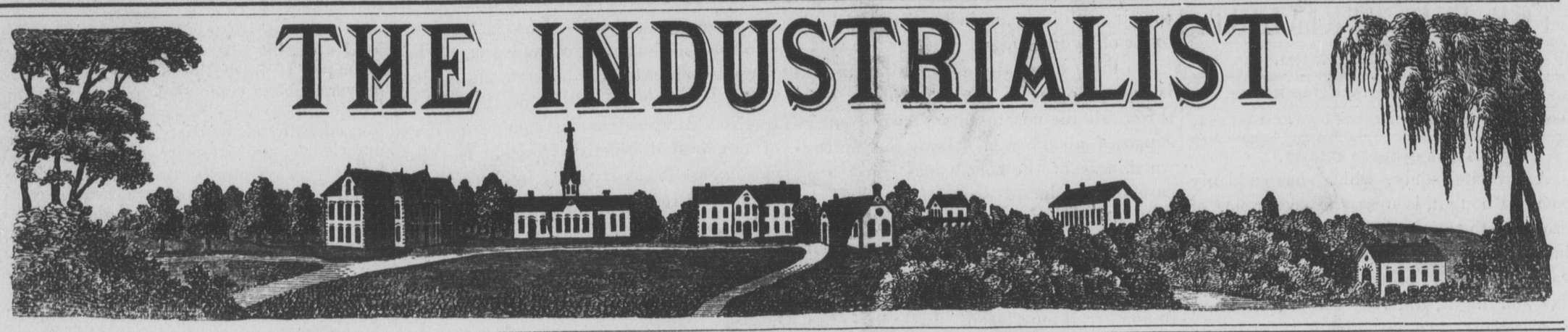
Printing.— Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.— The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,— attention being paid to spelling and to short and precise expressions in messages,— abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.— Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

F. G. Adams

THE INDUSTRIALIST



PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, MAY 7, 1881. No. 38.

KANSAS STATE AGRICULTURAL COLLEGE.

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BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

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RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Fish-Ponds.

Fish-ponds can be made on a large percentage of our southern farms, says the Dixie *Farmer*. A springy piece of ground, a small creek, or any combination which will furnish a constant supply of fresh water, is a prerequisite. Excavations can be made to any extent, to suit the taste or means of the owner. The dirt from these excavations should be removed far enough not to be washed back by rains. If the bottom can be covered with coarse gravel, or small stones, it will be desirable to do so, though it is by no means necessary. A few trunks of trees secured to the bottom will afford suitable hiding places for the finny population. An outlet as well as an inlet should be provided, and proper screens be arranged to prevent the escape of fish. The kind of fish to stock the ponds with depends on circumstances. If the pond is fed with abundant, living springs and streams; if the water can always be kept clear and cool, trout are,—undoubtedly the best fish to obtain. If the supply of water is scant, and the pond disposed to be turbid much of the time, bass, perch or carp will be desirable and will flourish. In most localities, the fish indigenous to our fresh-water streams will bear transplanting. The cost of stocking the pond need not be a large item, even if spawn or young fish are procured from a distance.

The pond need not be large to provide pasture for all a family of moderate dimensions can consume. Such food is decidedly healthy and palatable, and, when the supply is thus certain and easy of access, the cash expenses of a family are sensibly lessened. Pisiculture is receiving great attention in the northern and western portions of the country. Some of our southern rivers have been partially stocked with desirable varieties, and we hope to see the industry widely developed; but we refer, in this article, to private and not public effort in this direction. It will be a glorious thing to have all our lakes, ponds, creeks, bayous, and rivers well stocked with fish, from which the humblest man may draw supplies at will. But, as this desirable state of things is not likely to happen for some generations to come, the progressive citizen will do well to see what he can accomplish by his own endeavors, and for his own individual benefit.—*Exchange.*

The So-called "Hog Cholera."

If there is any one subject upon which people have muddled ideas, it is that of diseases of swine; and, consequently, if from any cause a number of hogs in a herd or neighborhood die in the same week or month, the statement is made and circulated that "cholera" prevails. The term is comparatively a meaningless one, and made to apply to any of a dozen different symptoms, when, in reality, hogs do not have any disease that rightly could be called cholera: hence, when our farmers lose some of their hogs, we hope they will investigate, and see if the loss is not due rather to some mismanagement of their own than any epidemic. Of course it matters little to the loser by what name the disease is called which robs him of the best of his herd; but no man in his right mind can suppose the hog becomes sick or dies from mere stubbornness.

Some law of nature has been violated, and nature's penalty, disease, follows. Nature points unerringly to the fact that the hog, as well as any other animal, requires a variety of food; and no greater mistake is made by breeders than confining him to corn day after day throughout the year. For fattening purposes nothing better than that can be produced for the same money, is likely to be found; but, for healthy, vigorous growth and frame making, it is far from a perfect food. It is too carbonaceous for bone or muscle production; and without these an animal cannot have vitality, activity or endurance. The unvaried use of it causes a feverish condition of the system, constipation, suspension of growth, and a general debility which makes the animal a ready prey to other and more malignant forms of disease. The Canadian and Yankee farmers do not lose their hogs from cholera: with some corn, they feed potatoes, pumpkins, waste apples, vegetables, oats, beans, barley, bran, shorts, mill-stuff, peas, etc., a variety that produces a remarkable growth of healthy hogs at a minimum cost.

In the Western States, where farmers raise hogs by hundreds, the most practicable means of supplying a change of feed is to grow clover, beets, and artichokes. Rightly managed, either of these will yield on an acre an enormous quantity of food on which pigs, shotes, and breeding animals thrive amazingly with little danger of the numerous ailments that cholera is a handy but nonsensical name for. Corn is good, well-nigh indispensable; but our farmers will be better off when they fully realize that something else is better to raise pigs on. Kansas farmers owe it to themselves to use every precaution against ravages of the much-talked-of "cholera."—*Kansas Farmer.*

THERE exists no surer or more hopeful sign of a better time coming, than the change which fifty years have brought about in the *literary and intellectual status of farmers as a class.* Books that are still read and republished, speak of the rustic husbandman as a clodhopper, only a little less stupid and brutal than the oxen and pigs that he raised and fed; and of all manner of tricks and jokes played off on these plodding louts, by their disdainful "betters." Their talk was slow, heavy and awkward as their gait; for only here and there were there any readers among them, or any ambition or care for polish. The world has turned upside down since those days; and the stone that the builders rejected has become the chief. All the vast array of periodicals that now wing their way into every corner, find their most appreciative readers and best supporters among the modern delvers in the soil. Not a paper now, unless absolutely technical, but has its agricultural column or quotation. Even our best magazines, like *Scribner* and *Harper*, find it to their advantage to cater to the tastes and practical interests of the fruit-growers and farmers.—*N. Y. Tribune.*

Stock-raising.

More and still more attention is being given to stock-raising in the west. On the small farms at the east and the north, with the long winters there, stock cannot be raised profitably. Here in the west, where lands are cheap, there is no branch of farming that pays so well. Like wheat, cotton and tobacco farming, stock-raising does not impoverish the soil. The droppings of the stock keep up the fertility of the land. This is an item of very great importance, and but little appreciated by farmers generally. Whether the farm shall be worn out or kept fertile, is but little considered. Those who have lived at the east know what worn-out farms mean. They know there is a great deal of hard work and very little profit in cultivating such. Stock-raising will avert the calamity of exhausted lands.

There is another feature that most farmers should consider, and that is, there is far less labor connected with stock-raising than with most other branches of farming. There is not the necessity for so many hired men. Plowing, seeding, harvesting and hauling the products to market, are, comparatively, avoided.

But, to raise stock profitably, ample preparation should be made. Pastures and meadows and corn-fields are needed. One should have these before embarking in the business to any large extent. Sheds and stables are needed for winter protection. Care and attention are as well rewarded in stock-raising as in any other business.—*Colman's Rural World.*

Our Exchanges.

Live chickens are shipped from Humboldt to Leadville, Colorado. By the way, much of our country produce finds a ready sale in the mountains of Colorado.—*Humboldt Union.*

Cattle men all over this section have commenced stocking their ranges with thoroughbreds. Every day we hear of large purchases; and, in a few years, a fine grade of cattle throughout will be the result.—*Anthony Republican.*

Many of our farmers are enclosing pastures with barbed wire, and will thereby save one-sixth of their time for farm labor formerly taken up in watering and changing stock attached to the lariat. A wise improvement.—*Osborne County Farmer.*

The WaKeeny *Leader* says, that the wheat in western Kansas is splendid: no better show for a crop was ever had anywhere, than they have there now. This excellent condition of this important crop extends to the State line on the north and west, and east to Salina.

The laws of Kansas are very favorable to the farmer and stock-raiser, in respect of exemption from execution or sale. He is secure in the possession of 160 acres of land, with all improvements of whatever character, his implements and machinery, two horses, two cows, ten pigs, and the year's crops.

A mule belonging to Esq. Bishop, of Hackberry township, had to be killed last Sunday, having hydrophobia in the worst form. It was bitten by a dog about thirty days ago, as well as several head of other stock belonging to Mr. B. The other stock as yet have shown no bad symptoms.—*Oswego Independent.*

According to official statistics of British agriculture, the total capital which it employs is valued at £667,000,000; and the loss, in 1878, from crop failures amounted to £58,353,750, and to about £60,000,000 in 1880,—a sum equal to nearly two-thirds the value of our recent enormous wheat crops. No wonder it hurts.—*N. Y. Tribune.*

Farmers and others from the country have been liberal patrons of druggists and wholesale liquor dealers during the past week. They have bought whiskey by the jug, and taken it home with them. At Rowley's, yesterday, the floor alongside of the counter was lined with jugs. A looker-on could see these jugs taken out and put into the farm wagons; and about as fast as one was taken another was filled.—*Commonwealth.*

Returns recently received from 917 points in ten western States, give the stock of young hogs as compared with 1880 as follows: 154 places report more, 735 report less, and 28 about the same; while returns regarding the prospective supplies for June from the same States (848 places) give as follows: 689 places report a light run, and 159 a good run. These reports were gathered with much care, and present a very fair index of the prospective hog supply. It is not likely, therefore, that the price of hogs will drop much during the next two months.—*Prairie Farmer.*

THE INDUSTRIALIST.

SATURDAY, MAY 7, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Atmospheric Ozone.

A favorite study, which has suddenly come to naught, is upon the occurrence of ozone in the atmosphere. Much painstaking labor has been expended in noting the variations of the ozone in the air between day and night, different seasons, climates, and sections. An incentive to these labors existed in the supposed relation of ozone to vegetable nutrition, and to the health of man. Ozone, being an energetic oxidizer, would form assimilable compounds of nitrogen, to nourish plants; and, if plants emit ozone, as is believed by some agricultural chemists, they would have within themselves the power to partially supply the nitrogen which they require. The large-leafed plants, according to this view, should be better able to supply themselves with these needed compounds; and, seemingly to substantiate this view, it was observed in agricultural practice that these same plants, with massive foliage, although they contain a larger amount of nitrogen, do not impoverish the soil as do the fine-leafed cereals. Further, the presence in the atmosphere of such a vigorous oxidizing agent would destroy such organic matters as pervade the air; and epidemic diseases would be rarer, in proportion as the ozone increased in the air. But, being irrepsirable from its great activity, throat diseases would proportionately increase. These considerations were sufficient to direct the greatest attention to atmospheric conditions in this respect. The usual test for ozone in the air has been the well-known iodide-of-potassium-starch-papers. The ozone oxidizes the potassium and sets free the iodine, which then reacts upon the starch, giving a blue which varies in intensity with the proportion of ozone present. This color is compared with a scale of varying tints, and the corresponding number read off. It was known that other substances, such as nitrous acid and hydric-peroxide, have the power to thus react with this test; and that ozone would act only in the presence of moisture. The influence of the latter seems not to have been given its true importance. The former objection was met by the fact that peroxide of hydrogen was not known to exist in the air, even in minute quantity; and it was supposed to have been demonstrated that it gives the reaction only when concentrated. The papers were blued under conditions when it could not have been due to nitrous acid. But later and more satisfactory investigations have shown that hydric superoxide does exist in the air, and that in sufficient quantity to react with the above test. The reliability of this test for estimating any oxidizing principle in the atmosphere, has been shown by observing that the hygroscopic character of the paper used, although the same formula be followed in preparing the reagent, so far influences the reaction that test papers from different sources, exposed together, give widely different results. The results with the same paper vary with the humidity, and seem to have little other value than is possessed in common by crude chemical hygrometers. Nor are the other tests which have hitherto been trusted, decisive between ozone and these other oxidizers. So that the existence of ozone as a usual constituent of the atmosphere, has been rendered quite problematical. Thallium papers, however, are not influenced by moisture, and seem to furnish a reliable means of estimating the oxidizing principle present in the air; and it seems, in general, to be peroxide of hydrogen.

Do these uncertainties regarding the existence of ozone in the atmosphere, overthrow all the conclusions drawn from its supposed abundance? Does the untrustworthiness of the conclusions based upon carefully conducted experiments, show the folly of trusting scientific "facts" and of accepting the theories founded upon them? To the latter, the answer is an emphatic no: to the former, in one sense, it may be yes; in another, it must be no. In the first place, while the proportion of the oxidizing agent, as determined by the iodide-of-potassium-starch-papers, is of no value whatever, and we do not know that ozone is ever found in the mass of the atmosphere, the existence of some oxidizing agent is not, and cannot be, questioned. And, whether the action upon the thallium or other test papers be due to one or several of these agents, from a practical standpoint would not seem to be so important as the fact that the oxidizers exist, and do purify the air by consuming the effluvia, and other noxious substances that find their way into it. Nor are we to lose faith in the conclusions and theories of scientists because occasionally these conclusions are based upon inadequate knowledge. The scientific mind of the world is the embodiment of the known facts of nature. When a series of facts, learned by observation or experiment, show the same thing, this scientific opinion is in accordance with them. When it is learned that other principles are involved than those previously known, without a protest, this opinion is founded upon the new facts. While a few scientific men, from association, find it difficult to give up long cherished-views, no class of men are so little dogmatic as they. Even the same individuals may hold tenaciously to other faiths, whether political, religious or socialistic, while in natural science he adjusts his belief in accordance with the light he has.

We claim it as the chief reason for trusting scientific opinion, that a vast corps of trained workers are constantly testing from every point of view the various principles upon which all theories and rules of action are based; and so soon as a single fact inconsistent with an accepted principle is found, the principle and all views and practices due to it, are discarded.

The question of the existence or non-existence of ozone in the atmosphere, which just now is in doubt because of the lack of proper tests, was previously answered in the affirmative; and the answer was a purely chemical one, involving chemical reactions. And yet no one will doubt that pure chemistry gives to man the most trustworthy evidence in his possession.—*Prof. Failyer.*

Entomological Queries Answered.

M. H. Carter, of Canton, Kansas, sends several specimens of beetles, with the following remarks: "Please tell me something in respect to their habits, whether they are injurious or otherwise; for we living out beyond the sixth principal meridian are very suspicious of every new insect. These insects are flying now in countless numbers; and their very abundance makes us fear some new wheat pest."

The beetles received are specimens of a small, brownish ground beetle, called by entomologists *Agonoderus comma.* They are common throughout the State, and more noticeable during the spring months, when, as our correspondent states, they fly in great numbers. The habits of the beetle are not fully known; but, judging by what we do know of it, and by analogy, we would say that the farmers in the section from which our correspondent writes, are to be congratulated on the abundance of the insect. It belongs to the extensive coleopterous family, *Carabidæ*, which includes many predaceous beetles well known as the enemies of some of our most destructive insects. The species in question is recorded by Prof. Riley, in his first report on the Rockey Mountain Locust, as destroying the egg of that far-flying pest; and it doubtless feeds largely, in both perfect and preparatory stages, upon the underground eggs and larvæ of other insects. The greatest annoyance caused by this beetle is when it swarms about the lighted lamp in the evening, in spring and summer, to the disturbance of the student.

Hon. Martin Allen sends a cottonwood twig upon which are fastened, in two overlapping rows, the flat, oval, bluish-grey eggs of the "katydid," *Microcentrus retinervis.* These eggs are found upon the twigs of many other trees, shrubs, and vines, and often on posts or other objects. They are placed there by the female in the autumn, and hatch the spring following. The young katydid feeds, like its parent, upon vegetation of any kind. Their notes are familiar to every one, and characteristic of the sultry evenings of midsummer. These notes are produced only by the males, which have the upper wings provided with rasps to produce, and "sounding boards" to intensify, the notes. The eggs are sometimes parasitized by a small hymenopterous fly, and in such cases of course fail to hatch.—*Prof. Popenoe.*

THE *Educationist* for May brings the programme, as far as completed, of the State Teachers' Association, to be held at Manhattan, June 21st, 22d, and 23d. It is rich and interesting, and we take pleasure in reproducing it:—

Tuesday, 7:30 P. M.—Annual address by Pres't Wm. Wheeler, Sup't of schools, Ottawa.

8 P. M.—Social and reunion.

Wednesday, 9 A. M.—A paper, "The Emilie of Rousseau," by Miss Grace C. Bibb, Professor of Pedagogics, University of Missouri.

9:45 A. M.—A paper by Mr. Carl Marshal, Paola. Discussion—Messrs. J. H. Lee, M. Chidester, R. C. Story, L. T. Gage, A. M. Crary, and others.

11 A. M.—A paper by Hon. J. M. Greenwood, Kansas City. Subject not yet announced.

1:45 P. M.—An address by Hon. O. S. Munsell, Council Grove, Kansas. "Mosaic compared with Modern Biolgy."

2:45 P. M.—A paper by Prof. D. E. Sanders, Fort Scott. "Manual Schools; Shams in Education." Discussion.

3:45 P. M.—A paper by Prof. D. H. Robinson, Professor of Latin and Literature, University of Kansas.

7:30 P. M.—Address by Hon. Jas. L. Denton, State Superintendent of Public Instruction, Arkansas. "The Educational Movement in the South."

Thursday, 9: A. M.—A paper by Hon. J. R. Campbell, Superintendent of schools, Newton, Kansas. "Educational Forces."

8:45 A. M.—A paper by Miss Lillian F. Hoxie, Fort Scott. "Supplementary Reading in Schools." Discussion.

11: A. M.—Hon. Geo. W. Hoss. "Literature in Public Schools."

1:45 P. M.—A paper by R. C. Meade, Superintendent of Atchison schools. "Hothouse Education."

A WAIL of discontent seems to be going up over the country among teachers, about the manner in which they are treated. The chronic complaint of low wages seems to be the foremost. They say the profession has no prizes.

A soldier can win promotion as well as glory, and can come at last to be one of the chief personages of his country. A man of business can gain wealth; another can at once sour into fame. The teacher has no hold upon his place and can acquire none, no matter if he is the best teacher in the universe: he is compelled to obey his inferiors. The average school committees say, the educational journals are not equal in knowledge and capacity to the average teacher. This assertion might be questioned; but probably the average school committee does not know as much about teaching as the teacher whom they elect, direct, and dismiss.

Holding his place at the mercy of the school committee, the teacher can not speak his mind freely, even on subjects relating to the management of the school. He must please, he must flatter them by acquiescence. He can be sincere, direct and wise only at the risk of his position. Our great lack is a better organization of the whole teaching service, so as to keep out the incompetent, and to enable the competent to gain due promotion and reasonable emolument.—*Miami Republican.*

Educational Gossip.

It will be remembered, especially by about one hundred citizens of Topeka, that a note for about $1,800 was given several months ago, in payment for a portion of the land upon which the Reform School is located. It was expected that the Legislature would make an appropriation to pay the amount, but none was made. Now the signers of the note have presented it to the county, requesting the commissioners to pay it, a law having been passed last winter authorizing the county to do so, and the auditor has refused to audit it. Some future action may be taken by the board, ; but so far the signers have not received much consolation. —*Commonwealth.*

The following-named teachers have been selected by the county superintendents and approved by State Superintendent Speer, as normal-school conductors and instructors: Shawnee county, conductor, L. A. Thomas; instructor, E. E. Heath; E. S. Randlebush and Chas. G. Fox will also assist. Osage county, conductor, J. A. Race, salary, $125; instructors, M. R. Banker, J. E. Williamson, Judson Adams, W. E. Baily and M. P. Spencer. Elk county, conductor, M. R. Cook, salary $125; instructors, J. D. Simpson and N. Newby. Dickinson county conductor, L. A. Thomas, salary $160; instructors, O. H. Crary and J. R. Burton. Bourbon county, conductor, D. E. Sanders, salary $130; instructors, P. C. Young, of Lawrence, and B. Hudson, and O. P. Lee, of Fort Scott. Mitchell county, conductor, F. A. Fitzpatrick, salary, $185; instructor, Miss M. H. Spencer. McPherson county, conductor, W. H. Sweet, salary $150; instructors, C. W. Veturn and C. Cook. Atchison county, conductor, H. D. McCartney, salary $150; instructor, B. H. Nehant. Davis county, conductor, R. H. Hay, salary $100; instructor, Miss Frank Orr. Chase county, conductor, J. W. Cooper, salary $125. Anderson county, conductor, B. P. Harris, salary $150; instructors, Nannie B. Hunter and W. J. Brinckley. Sumner county, conductor, L. M. Knowles, salary $125; instructors, Ansol Gredley, jr., and W. J. Lingenfelter. Osborne county, conductor, D. C. Tillotson, salary $100; instructor, F. Brinswade.

We read in the Wichita *Beacon*, that the free schools of that place have closed for the year, on account of a lack of funds. It might be unjust to blame the growing queen of southern Kansas for not providing better for their educational machinery; but it is more than we can understand if a home paper rejoices over the fact, and concludes an editorial on the subject with talk like this: "Property rebels and refuses to carry the unjust load. It protests against the unlawful responsibility, and its protest takes the shape of evasions. It avoids, evades, shirks, and deceives the tax assessor. Property has an instinct that it has no more obligation to educate the public as a charity than it has to clothe and feed the public. It has an instinct that the public is under as much honest, manly obligation to clothe and feed its mind as it is to clothe and feed the body,—under a higher obligation, because it is a nobler function of the individual. It knows that if it pauperizes the intellectual faculties of the nation, it will have more and more of them to feed annually in poor-houses and asylums, in jails and penitentiaries. If the public had to be fed and clothed by a tax on property, there would be frequent long vacations when it would be have to go without provender—the funds exhausted."

THE INDUSTRIALIST.

SATURDAY, MAY 7, 1881.

The rainfall for the week past was .66 of an inch.

Prof. Hofer, who has been seriously ill for some days, is recovering.

We hope, from this time on, to be able to give the exact rainfall of each week, from the records of the Chemical Department.

We do not remember to have ever before seen the wheat crop thicken and generally improve in appearance as it has during the past week.

Work on the new building has been carried on vigorously during the week. The excavations are nearly completed; and the masonry work of the foundation is well under way.

Two old-time students of this College, Mr. Albert Stiles and Miss Amelia Noyes, were united in marriage last evening. These worthy young people have our best wishes for their future success in life.

We acknowledge the receipt of an invitation, from Chancellor Marvin, to be present at the Commencement exercises of the State University, to be held June 3d to 8th inclusive. The programme of exercises is a very attractive one.

The perils of Kansas journalism have received ample illustration during the week; no fewer than four editors having received bodily damage from cane, horsewhip or cudgel. We rejoice to be able to state, however, that so far no one has ventured the highly original remark, "Whiskey done it."

On the farm, seven acres of blue-grass sod, in field No. 1, is being plowed up and fitted for corn-planting. This is probably the first considerable area of blue-grass that has been turned under in this part of the State. We shall now have an opportunity of noticing the kind of "sod corn" an old blue-grass pasture will raise. We ought, perhaps, to observe that this field was "seeded down" in 1875.

During the week, one of our Berkshire brood sows, having outlived her usefulness, ended a useful career at the hands of the butcher. This sow was purchased by the College early in 1878 for $20; and she was sold the other day for a few cents less than $20. Meanwhile we have received $135 for pigs from this sow, sold for breeding uses, to say nothing of a large number of "stockers" sold from time to time.

We are informed, by circular, that the third annual meeting of the Bismarck Grove Sunday School Assembly and Church Encampment, will be held at Bismarck Grove, near Lawrence, Kansas, July 5th to 15th, 1881. The programme promises a series of interesting lectures, a course of practical instruction to Sunday School and church workers, and a pleasant and profitable time generally. For programme, send to J. W. Campbell, Topeka, Kansas.

The seeds of a wild grass sent by Mr. J. S. Waters, of Oswego, Kansas, are apparently those of wild rye, *Elymus Virginicus*, probably. The grasses of this genus (Elymus) are common in moist lands throughout the State. They are coarse perennials, and of no particular value, although they are generally cropped close by cattle. So far as we have observed, they are not troublesome weeds, although they show a tendency to spread, which might make them troublesome in low pasture or meadow lands.

Our very active Scientific Club has lately given its energies a new and unexpected turn, which shows the great enthusiasm of its members for science, particularly in its practical relations. Besides digging an extensive ditch for the purpose of draining a morass in the neighborhood, we notice that the Club has recently carefully spaded and leveled a neighbor's field, afterwards seeding the same to grass in good style. Such little acts of kind thoughtfulness, while for the time seeming to dampen the ardor of scientific pursuit, will not go unrewarded.

SOCIETY HALL, April 30th, 1881.

Webster Society met at usual hour last Saturday evening. President being absent, Vice-President J. C. Allen called the Society to order. Debate on the question, "*Resolved*, That the natural sciences should be taught in the public schools," was decided in favor of the negative. Extemporaneous speaking was indulged in by all. Messrs. Knaus, Neiswender and Needham were appointed a committee to prepare a programme for a special session at the end of this term. Question for next meeting, "*Resolved*, That war does more harm than good." Affirmative, Messrs. Fairchild and Allen; negative, Messrs. McElroy and Mason. The *Reporter* will be presented by Mr. Marlatt. After report of critic and reading of minutes, the Society adjourned. ST. AUGUSTINE.

NATIONALIST ITEMS.

The yard around the Presbyterian Church has been nicely graded, preparatory to seeding it down to blue-grass.

For the first year since the settlement of Kansas, we have heard of but little damage done by prairie fires this spring. Most of the prairie in this vicinity has not been burned over; and we trust that it will never be generally done again.

A change in time on the U. P. R. W. will take place shortly. The morning train will run through to Denver instead of to Ellis as now. An emigrant train will also be put on the road; and emigrants for all points in the far west will come via this route, in the future.—*Ex.*

THE SPRING TERM.

The winter term of twelve weeks closes with examinations on Friday, March 25th. The spring term begins on Monday, March 28th, and closes with commencment exercises, on Wednesday, June 8th. Students already in the regular course find this term quite essential to their successful progress. Those about to enter will need better preparation than was required for the previous terms of the year. Examination for entering includes Reading, Spelling, Writing, Geography, Arithmetic, and the elements of English Grammar. Classes will recite on the first day of the term, and new students arrange to begin, if possible, with the classes.

The following branches will be taught in classes arranged with reference to general advancement of students:—

First Year.—Algebra. English Composition. Botany, with Drawing. English Drill. U. S. History. Book-keeping.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—U. S. Constitution. Political Economy. Agricultural Chemistry.

Students are admitted to such studies as they are able to pursue to advantage, though advised to follow essentially the regular course, so far as they can. Drawing, music, and the various industrial arts named elsewhere, are so arranged as to accommodate students of all grades of advancement.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere: —

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*— History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.— General principles governing the development of domestic animals. The laws of heredity of disease,— of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*— The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,— in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,— variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,— observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures, and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.— Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.— One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,— is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY— Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.— The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling— section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*— The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,— roots, stems, prefixes and suffixes,— associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.— A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.— The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.— The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.— To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,— marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.— The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

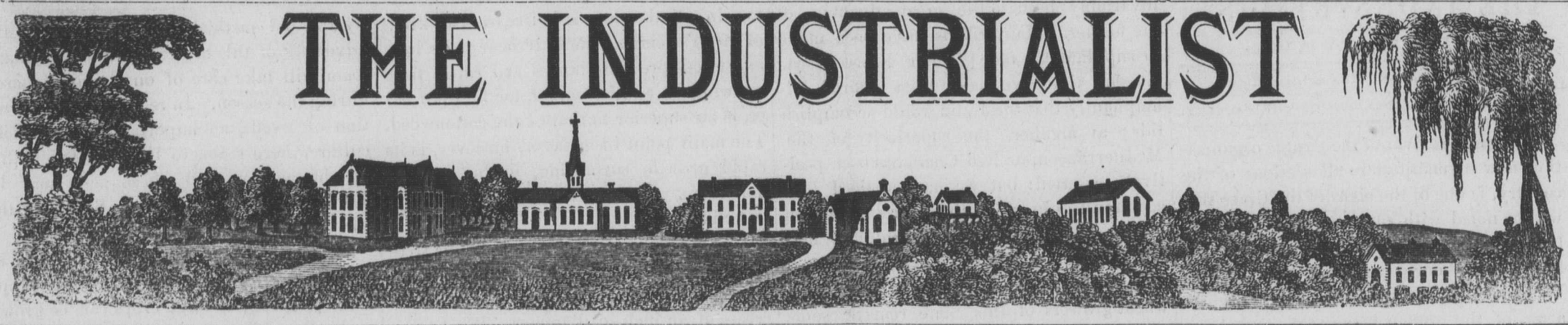
Printing.— Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.— The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,— attention being paid to spelling and to short and precise expressions in messages,— abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.— Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

Historical Society

THE INDUSTRIALIST



PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, MAY 14, 1881. No. 39.

KANSAS STATE AGRICULTURAL COLLEGE.

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RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Vennor and the Weather.

The semi-annual change of weather probably occurred on Sunday, April 24th, and the six months' summer has commenced throughout the northern hemisphere. This event has thus happened ten days ahead of its average time, perhaps in some relation to the fact that last fall the opposite change occurred three weeks before the average time (on October 17th). The present is, therefore, a suitable occasion for noticing the success thus far of Mr. Vennor's predictions, published in his almanac for 1881. The majority of these announcements are phrased in a diction so loose that entire nonfulfillment would be impossible. Of such it is idle to treat. In this category, we include the following extract from the "probabilities" for January last: "The second quarter will open with heavy snowfalls, and terminate in a cold snap." Now, since snow or cold snaps occur every three or four days in our winters, and the word quarter is a designedly *safe* method of predicting, it would be almost impossible to refute such a forecast for any "quarter" whatever. But *definite* announcements possess a test value, for in these a guesser would be correct exactly half the time. Now, in this class of forecasts, Mr. Vennor has not had the luck of the average guesser, as will appear from what follows: "I expect blockades of snow in the United States about the 7th and 8th of January." Both these days were fair. The announcement for February contains the most signal failure which ill chance could concoct. "Thaw (which will be interrupted by a brief [!] cold spell) will extend from about [!] the 18th of January up to the 12th of February, with balmy, spring-like weather prevailing in many parts, and snow rapidly disappearing." In many winters the cunning ambiguity of "brief" and "about" would have saved him; but the past winter had no mercy on prophets who prated of thaws and spring-like weather, located they their warm spells definitely or indefinitely. We doubt whether anybody whose vocation called him out of doors during the above twenty-five days, will have any hesitation in asserting that a grosser error could, by no possibility, have been made. Recurring to the actual figures of the thermometer, as recorded daily at sunrise, we find that from January 15th till February 7th the mercury was not above freezing on a single day; and on no morning during January, February or March did it reach 40°. So much for the long thaw and balmy, spring-like weather. "This term will be followed about the 16th by storms, previous to the setting in of a colder term." The coldest day in February was the 2d.

For March most of the announcements are vague; and, in ordinary times, would, therefore, be accepted as correct by persons disposed to be lenient. But not even Mr. Vennor's cautious "the month will probably end lamb-like" contained a particle of truth. There was not one mild day in the month; and on the last two days snow fell. "On the 9th and 10th, gales are probable." Almost any breeze or weather, except a drizzle, might somewhere be thought a gale, "probably;" but, on the 9th and 10th of March, it drizzled. The only day on which a gale actually occurred was the 27th, of which day Mr. Vennor said nothing. "There will be sharp frosts in the beginning of April." (There was nothing else from the 1st to the 13th but frost.) "But the spring will open favorably, and everything will be pretty well advanced by April 15th." Farmers say differently. "Floods may be expected in Chicago about the first week in April." Rivers are usually high in April. The only question is, which week; and the freshet in Chicago dates only from April 20th. "There will be warm weather just following the 20th." The weather became warm on the 24th; so this might have been claimed as an approximate hit, had it not been spoiled by the mistaken prediction of snow on the 25th and 26th. The season changed, we believe, on the 24th, rendering snow-storms out of the question for six months.—*The Nation.*

Carp in America.

Mr. Fred Mather alludes to some instances of animals and plants changing with change of climate, either by improving or deteriorating; and gives the fierce English bulldog as an example, which when taken to India loses its courage, and becomes a complete coward. The carp brought to America greatly improves, thriving here in proportion to the warmth of the water during summer, often attaining three times the size common in their native Northern Germany. Among many witnesses cited who supply evidence on this point, one mentions a pond in which the temperature was frequently raised to 100° F. by the steam of a low-pressure engine condensing in it, and where the growth of the fish was beyond example. Colonel Akers, the Tennessee fish commissioner, Mr. Frank Green, of Nashville, Mr. Geo. W. Hopkins, of Mt. Sinai, Long Island, Mr. J. H. Dinkins, Commissioner, Austin, Texas, and Mr. Volney Metcalfe, of Kosse, Texas, give similar testimony as to the growth, multiplication and thrift of the carp in their waters.

The domesticity of this fish seems to be a special merit. It can be grown in the house-yard, if there are means of keeping a pond filled with water deep enough for the fish to be safe in the mud of the bottom through winter, and shallow enough to become well heated by the summer sun. It thrives best in separate ponds, not over deep; and feeds on cooked potatoes, seedy vegetables, as tomatoes or squashes, corn or wheat bread, or similar food. It spawns early, and as soon in the season as the water becomes about 65°, and would multiply by thousands in one summer but that it is given to eating its own eggs. Baron von Behr tells how to prevent this thinning of the brood by sticking branches of evergreen or other trees in the edge of the pond, so that the leaf-spray may be about six inches beneath the surface. The glutinous coating of the eggs causes them to adhere to these twigs, when they can be either fenced in by a wire screen until hatched, or carried in water to another pond. Mr. G. C. Rixford, of Florida, and others speak of the tameness of the carp, which come for food as eagerly and quickly as a drove of pigs; and the Baron says that they eat bread from his children's hands.—*N. Y. Tribune.*

Cotton Culture.

As cotton has been raised in Kansas with some success, by a few individuals only, others may wish to know the process of its culture, so as to give it a trial also.

There is no great secret in its cultivation. Any farmer who can raise a good crop of corn or potatoes, could raise a good crop of cotton also. * * * * *

The ground should be plowed either in the fall or winter, and re-plowed just before planting in the spring. The time of planting must depend much upon the season. Cotton seed requires more warmth to germinate it than corn, hence it should not be planted as early. After it is up, it should be pushed forward as fast as can be done by good cultivation. The ground before planting should be well harrowed; and, if rough and the season dry, it should be well rolled. The ground should be marked out both ways with a sled marker, so that the seed could be planted as near the top as possible. The rows should be three feet apart one way and four feet the other. This would give an opportunity of tending with a cultivator. Two seeds should be put in a place; and, after they are up, one is sufficient in a place.

The crop should be cultivated not less than once a week, or every ten days, and so on till it begins to bloom, which will be six or eight weeks after it comes up. After it begins to bloom, the cultivator may be stopped. In very rich ground, the stalks may have a tendency to grow very tall; and, when this is the case, it is very profitable to pinch the tops off and make it grow bushy. Old cotton-raisers say, that the most cotton is produced where the stalks do not grow over four feet high.

Any ground that will produce a good corn crop in this State, will produce cotton. But I am rather inclined to believe that our high dry prairies will do better than the rich, black, creek or river bottoms. In the latter it will have a tendency to grow too tall; while in the prairie it will produce more bolls.

I am also of the opinion that in the southwestern part of this State it will do the best: the land is more sandy, and of a warmer nature than here. I would like if the farmers out there would give it a trial, and then report their results. Seed could be bought of the Plant Seed Company, of St. Louis, on very reasonable terms, about 30 cents per pound; and three or four pounds will be plenty for any one to experiment with.

In the fall, when the bolls open and the cotton ripens, the picking season begins. In this, the old and young, large and small, can do something. It is not hard work, but looks rather tedious. The cotton bolls are taken out with the thumb and fore-finger and put into baskets. In the southern States, the cotton, after picking, is put sometimes into rail pens; and remains there for months, exposed to the fall and winter rains, without much harm.

The cotton raised in this part last season was of as fine a quality as any that was ever raised in the south; and, with our improved methods of culture in the north, we could raise it fifty per cent cheaper than they do. The time is coming when cotton will be one of the staple crops of this State, and we will have the cotton factories here, side by side with our cotton fields.—*Jno. H. Hill, Oswego, Kans., in Kansas Farmer.*

Our Exchanges.

A gallon of buttermilk on subscription is the latest at this office. But we accepted, as we will anything else that a man has to offer that we can masticate.—*Gould Pioneer.*

Ed Williams informs us that he sheared 72 rams for Sparks Bros., last week, whose fleeces averaged 17 pounds each: one of these sheep sheared 23 pounds. The Sparks Bros. are successful wool-growers and pleasant gentlemen.

Eighty per cent of the cattle on the range in the upper Arkansas Valley, and in the counties south of the river, are Texas, Colorados or half-breeds, and are in no sense native Kansas stock. They are driven in from other States, and held on ranches by the owners. The shipping in of a large number of thoroughbred bulls, within the past year or two, promises a great improvement in the stock of that great region. Experience proves that a 1,700 pounds three-year-old is not an impossibility in that country, under this new system of crossing the very best with the poorest. The stock interest of that section is rapidly growing into immense proportions.—*Great Bend Register.*

THE INDUSTRIALIST.

SATURDAY, MAY 14, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

THE great revival of the grange organization, now so manifest in all sections of the country, is one of the signs of the times that will be noted with pleasure by all who interest themselves in the advancement of that large class of our population,— the farmers. Whatever may have been the original character of the grange movement, and however much the organization may in time past have been perverted to selfish ends, it has given, during the past four years of adversity, abundant evidences of its great usefulness to the farmer. These four years of adversity have taught the grange many useful lessons. During this time, it lost many members and much apparent influence; but it found what will bring a membership and influence that will be permanent,— its proper work. So long as the grange adheres to its present programme,— the encouragement among farmers of cooperation, the development of social and educational interests, and general improvement in all farm methods,— its growth and development will not be retarded.

A Hole in the School Law.

The law of Kansas organizes every city of the second class into a separate school district; and provides that, for the government of such district, a school board shall be elected cotemporary with other city officials, and consisting of two members from each ward. A paragraph permits the attachment of adjoining territory to such district; but nothing is said of the representation of the attached territory in the school board.

It would, evidently, be unlawful to give such attached territory the right to elect two members like a city ward, because "said board shall consist of two members from each ward;" and a ward is always a part of an organized city. No law reasons can be given for the election of but one or any number of board members by such attached territory. Not belonging to the city, and not under the jurisdiction of the poll judges and other officials, such territory cannot vote with any of the wards, and, for additional reasons, not with all wards. Our law code says elsewhere that, not only every male, but also every female, citizen of proper age, shall have the right of suffrage in educational matters. Now, what is to be done here?

The question is one that affects the suburban residents of probably twenty towns in this State; and we would like to know how it has been answered in different places. The writer bears his disfranchisement with resignation: how do other Romans feel about it? and does the school-tax collector exclude them, as well as the poll judge? It is to be regretted that legislatures cannot find time to consider educational bills with more care.—*Prof. Walters.*

Early Red May Wheat.

Of all the considerable number of sorts of winter wheat successfully grown in Kansas, none have proved so popular and useful as the Early Red May. Other sorts have been found, like the Fultz and Lancaster, which gave, in particular seasons, a stronger growth of straw and a larger yield of grain; and a still smaller number of other kinds, like the Golden Straw and Gold Medal, yielded whiter and more handsome flour. But a comparison of the Early May, during a number of years, with any other sort that we have yet seen in Kansas, has invariably been to the great advantage of the former. Many efforts have been made to supplant the old popular Kansas sort. At one time, we have been assured triumphantly that the Fultz would accomplish this; at another, the superiority of the Mediterranean, or Red Chaff, has been positively asserted: but we have noticed that communities in which these sorts have been tried for a length of time, return quite hastily to the cultivation of the Red May. We remember hearing one of the large wheat-growers of this State remark some years ago, after trying a large number of kinds of winter wheat, that, had he grown only the Red May, he should have been a less wise but richer man by several thousand dollars.

The superiority of this sort of wheat for Kansas, has been strikingly shown by the experience of the past six months; for, if the published reports of the condition of the crop in different sections of the State may be trusted, the Red May has been less injured than any other sort, by the severe weather of the past winter. The reason of this general superiority of this variety of wheat for Kansas is not difficult to explain, when we take into account the habits of the plant and the peculiarities of our Kansas climate. The weak point of this climate, so far as wheat-raising is concerned, is the spring months. Indeed, proper spring weather, meaning by that term the peculiar cold, wet weather which, more or less, prevails in Michigan and Iowa from February until the middle of May, is all but unknown in Kansas. Our winter is no sooner past than the summer heats are upon us. This gives our wheat almost no time to tiller and generally strengthen itself. Almost from the day that the frosts have left the ground, the sun and elements ply whip and spur to the wheat plant, driving it to the harvest early in June.

Under such climatic conditions, any of the large, slow-growing sorts are almost certain to fail. The season does not give the time needed to properly mature them; and the result is a thin growth of straw, bearing heads poorly filled with shrivelled grain of a peculiar, coarse, hard texture. This has been the result of our experience with the Clawson, the Wicks, Silver Chaff, and others sorts. For general cultivation in Kansas, the small, early, rapid-growing red sorts will give best results, because they can keep step with the season. It is because it possesses these qualities, combined with great hardiness, that the Early Red May has proved the Kansas farmer's chief reliance.—*Prof. Shelton.*

The Ailantus.

This tree, a native of China, will some day become a chief timber-tree of western Kansas. Its many good qualities are bound to give it the deserved place alongside of the cottonwood, the box-elder and the maple. Some years ago, the Government distributed an amount of this seed throughout the country to give it a trial. Nurserymen, expecting to realize a good profit from its sale, gave it some attention; but the reports of the experiments made with it were unfavorable, and, therefore, the tree was neglected. They reported it as an irrepressible sprouter, as unfit to stand severe winters, as an extremely late leafer, and as an inferior timber-tree. Since then, continued experiments have proven enough redeeming qualities, however, to place it at the very head of trees grown for fuel on Kansas highlands. Where acres of it are planted for timber, in lots where the flow of sap is checked by dry fall winds, it never freezes out. Its late leafing is no special disadvantage in a timber lot; it is free from all kinds of insect enemies; the bitterness of its bark and wood prevents horses and cattle from gnawing it; and its timber, for fuel purposes, is far superior to that of the cottonwood. The main point in its favor, however, is its rapid growth, surpassing, during the first four or six years at least, all other trees of our climate.

It is not uncommon to find ailantus trees showing, for the first eight years, an annual growth of from three to five feet, with an increase of an inch in diameter. We have a tree on our place, transplanted and pruned in the spring of the third year, which measured, at the end of that season, twelve feet, with a diameter of over three inches; and have measured, in the yard of a neighbor, a tree eleven years old that showed a diameter of nearly thirteen inches. Of all the trees grown in the College nursery, the ailantus shows the tallest average growth. As a shade tree, it is not a success, however, on account of its sprouting, late leafing, and the villainous stench of its blossoms. It is for these reasons, probably, that its planting was discouraged by many of those that experimented with it.

The ailantus tree is a kind of giant sumach. It has, like that shrub, a very thick pith column when young; but as, it grows older, the pith shrinks and dries up altogether, while the wood hardens. It is grown from the seed, which resembles that of the maple, though much smaller. The seed can be obtained of any seedhouse. Three years ago, we planted a ten-acre lot, near Milford, Davis county, with but three dollars' worth of seed, for which we sent to Philadelphia. As the tree can stand almost any amount of handling, it is probably best to start it in a nursery first, and transplant it in the spring of the second or third year: we should do this in planting another lot.—*Prof. Walters.*

Listing Corn.

This new method of corn culture seems to be rapidly gaining in the popular estimation; and, although its introduction in this section dates back no further than two or three years, at the present time a very large proportion of our farmers own listing plows, and use them.

We have recently conversed with a number of intelligent farmers who have given the new method a trial, and all expressed themselves very positively in its favor, averring that larger yields of corn can be made at much less cost per bushel than by the old method of plowing and check-rowing. We noticed, in a recent trip to Topeka, that a large proportion of the immense corn-fields near Topeka and Silver Lake are this year planted by the listing process. To the careful farmer, this method seems like a slovenly, shiftless practice, in the extreme. But, before passing harsh judgment upon this method, it is worth while to remember that a method is not necessarily bad or even "shiftless" because it involves little labor. Much of the labor of every farm is applied indirectly, and is wasted. Nearly every recent improvement in agriculture has been in the direction of saving labor. The old-time farmer who grew wheat by the method of summer-fallowing, plowing the land three or even four times for a crop of wheat, has always regarded the modern method of turning under at a single plowing a clover or grass sward, preparatory to wheat sowing, as a very lazy method. Nevertheless, the clover-grower is winning, even in wheat-raising, all along the line.

There seems to be no doubt that upon loose, fertile soils as large yields of corn, at much less cost, can be grown by listing than by the old method. It is claimed by the advocates of this method that one man and team will take care of one hundred acres, during the season. In regard to the destruction of weeds, an important point in corn culture, there seems to be no question that by the new method these pests may be destroyed at least as effectually as by the old.

It should be remembered that corn as ordinarily grown is not an exhausting crop; and, by listing, as large crops can be grown as by the old method, the weeds as completely destroyed, and the ground as thoroughly stirred during the growth of the crop. We see no good reason why it should not be more generally adopted. We are quite confident, however, that upon inferior lands, and especially those which are clayey in composition, listing will never be a popular method of corn-growing.—*Prof. Shelton.*

Educational Gossip.

Winfield has a school library.

As schools are closing, book peddlers are increasing.

Quakers are about to establish an industrial school for colored people, near Columbus.

Prof. Theodore Dobbins, of Lawrence, was killed, by jumping from a Kansas Pacific train, Thursday night, last week.

Clay Center has about decided to build a $15,000 or $20,000 school building, to be completed in time for the fall term.

The school-house appropriated for the colored children, at Oskaloosa, was destroyed by fire Tuesday morning, last week.

Sup't Theo. Bracken, of Mitchell county, has resigned his office, and the county board has filled the vacancy by the appointment of C. A. Lewis.

The "Course of Study for Kansas Normal Institutes" goes to press the coming week. It will be issued in the convenient form of that for last year.

D. C. Tillottson, formerly of Jefferson county, recently principal of the North Topeka schools, has been elected superintendent of the city schools of Topeka.

On Monday of last week, Gaylord school district voted bonds to the sum of $3,000, to build a new school-house on the school block, in east Gaylord. There was not one vote cast against the bonds — not one vote.

County Superintendent Starkweather, of Clay county, has made application to Prof. L. A. Thomas, Principal of the Lincoln High School, of Topeka, to take charge of the County Normal Institute, in July; and it is hinted, that he may be tendered the city schools here by the new board of education, at a larger salary than he is now receiving.

There are six dollars at the Oxford post-office for any man who will go and get them. Some ten months since, James W. Wright placed five dollars there and J. T. M. Coldwell added another dollar. The conditions upon which this money is to be paid are as follows: The man receiving it must have lived six weeks in Kansas, and during that time must have been a good neighbor and citizen; must have returned everything he borrowed, and told nothing but the truth. Several applicants for the prize have presented themselves, but have always gone away self-condemned. The money is drawing twelve per cent interest; and we rather suspect will be a neat little sum by the time it is paid out.—*Sumner County Press.*

Nearly every person can remember how flustrated and embarrassed he or she always was when a scholar, if a visitor entered the room, and how the visitor always got more attention than the lessons. We believe that parents should closely watch the progress of their children, and assist them to acquire knowledge; but don't visit the schools to criticise teacher or scholars. The duty of visiting schools and criticising or directing teachers should be delegated to well-chosen officers of your school district, and your smartest men should be on the board. Assist the teacher all you can, in two ways. Give them what information you can of your child's disposition and mental attainments, and teach your child to obey the teacher implicitly.—*Peabody Gazette.*

THE INDUSTRIALIST.

SATURDAY, MAY 14, 1881.

Prof. Ward's class in surveying is hard at work on a topographical map of the College farm.

On Monday next, Prof. Popenoe's class in entomology takes up the study of anatomy in charge of Prof. Shelton.

Rain fell four times during the week, aggregating ninety-two hundredths of an inch. These light, slow-falling rains are all absorbed by the soil.

The work of repainting the different College buildings has gone on rapidly during the week. The coat of fresh paint adds much to the appearance of the buildings.

A new kitchen attachment, put up in the rear of President Fairchild's house by the Mechanical Department, adds much to the convenience of the presidential homestead.

We should have said just one week ago that the public exercises on Friday afternoon of that week consisted of declamations by the second division of the third-year class.

A number of freshly spaded flower beds, triangular, circular, semicircular, and elliptical, have been planted with geraniums and the like, and now promise much in the way of adornment.

All students and friends attending the Commencement exercises of the College, will be returned home on the U. P. and A., T. & S. F. Railways, at one-fourth the usual rates. Similar favors will probably be given by the other roads of the State.

The near approach of the end of the College year makes plain the existence of a number of "tender attachments," in persons and places, before quite unexpected. The "sweet innocence" of the young couple who keep it "all to themselves," is as smile-provoking this year as ever.

For fear that strangers might credit that cry of agony,—neither a groan or shout,—which echoes and reverberates through these classical halls about 400 times a day, to the seniors in rehearsal, or possibly the singing class, we rise to say that it's only the stone-mason dropping a gentle hit to the hod-carrier.

We have in the past, and expect in the future, to publish a good deal of original matter and extracts on the subject of fish culture, believing this to be a matter worthy of the attention of our enterprising farmers. We this week clip a short but instructive article on this same subject, from the New York *Tribune*.

It has been supposed by many, that a good water-power might be created by cutting a channel between the Blue and the Kansas, where the two rivers approach each other, about two miles east of this town. The fall has been estimated at from ten to fifteen feet. The class in surveying, one day last week, ran a line through Mr. Allen's farm, between the two rivers. The distance is seven hundred yards, and the fall not quite five feet.

In a private letter, lately received, Regent Hoisington, of Great Bend, assures us that the wheat in his section has not been materially injured by winter killing, the damage in the worst cases not exceeding ten per cent; and that the prospect for grain and fruit—including, we suppose, "soap-weed"—is magnificent. We are glad to know this. If grit and energy and a Kilkenny-cat kind of hanging on are factors of success, the people of Barton county should have full granaries.

SOCIETY HALL, May 13, 1881.

Society called to order by President. Devotion by Mr. Short. Proceeded to debate on the question, "*Resolved*, That the metric system of weights and measures should be the only legalized method in the United States." Decided in favor of the affirmative. Extemporaneous speaking was conducted with some warmth. Under the head of assignment of duties, Mr. Copley and Mr. Short were appointed on debate; in two weeks, Mr. Cottrell and Miss Quinby. Paper next week: everybody come. HOMBRE.

Several interesting facts were brought out during the discussion on forest-tree culture, at the last meeting of the Manhattan Horticultural Society. The beautiful grove on Jesse Ingraham's place was planted in 1867. The black walnuts average a height of thirty feet, and a diameter of six inches; the cottonwoods, a diameter of twelve inches. The trees stand very thick, in rows eight feet apart. Mr. Wells said that trees on College Hill had made a still more rapid growth. There are trees on Prof. Ward's place in town, which were planted about twenty years ago. A tall cottonwood measures twenty-four inches in diameter; a maple, fourteen inches; a honey locust, twenty inches; while a black walnut, only seven years from the seed, has attained a diameter of six inches. It stands alone, and is not overtopped by other trees.

SOCIETY HALL, May 7th, 1881.

Webster Society convened at usual hour last Saturday evening. After roll-call, debate on the question, "*Resolved*, That war does more harm than good," was ably discussed on both sides; but the decision of the judges was in favor of the affirmative. Extemporaneous speaking was lively and entertaining, and participated in by all present. After an intermission of a few minutes, an excellent number of the *Reporter* was presented by Mr. Marlatt. The report of the committee on special session was accepted. Question for next meeting, "*Resolved*, That the railroads of a country should be owned and controlled by the government." Speakers on the affirmative, Chas. F. Bailey and M. H. Markcum; negative, O. G. Palmer and Geo. F. Thompson. Declamation, composition and select reading will also be a part of the programme. After report of critic and reading of minutes, the Society adjourned. A good time anticipated at next meeting. ST. AUGUSTINE.

No paper more carefully made up or neatly printed than the INDUSTRIALIST, comes to this office. It is published under the auspices of the State Agricultural College, at Manhattan, with E. M. Shelton, managing editor, assisted by the members of the faculty. A large amount of interesting matter pertaining to the College, its workings and interests, are found in it. It is neat as a pin, bright as a dollar, and well worth the nominal price of fifty cents per year.—*Kansas Farmer*.

THE SPRING TERM.

The winter term of twelve weeks closes with examinations on Friday, March 25th. The spring term begins on Monday, March 28th, and closes with commencement exercises, on Wednesday, June 8th. Students already in the regular course find this term quite essential to their successful progress. Those about to enter will need better preparation than was required for the previous terms of the year. Examination for entering includes Reading, Spelling, Writing, Geography, Arithmetic, and the elements of English Grammar. Classes will recite on the first day of the term, and new students arrange to begin, if possible, with the classes.

The following branches will be taught in classes arranged with reference to general advancement of students:—

First Year.—Algebra. English Composition. Botany, with Drawing. English Drill. U. S. History. Book-keeping.

Second Year.—Geometry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—U. S. Constitution. Political Economy. Agricultural Chemistry.

Students are admitted to such studies as they are able to pursue to advantage, though advised to follow essentially the regular course, so far as they can. Drawing, music, and the various industrial arts named elsewhere, are so arranged as to accommodate students of all grades of advancement.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blow-pipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

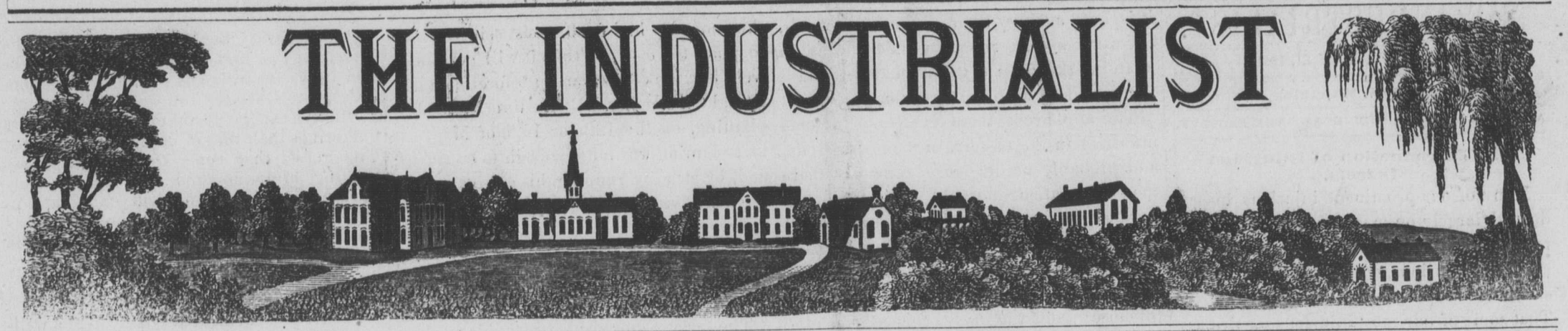
Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

L. G. Adams.

THE INDUSTRIALIST



PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, MAY 21, 1881. No. 40.

KANSAS STATE AGRICULTURAL COLLEGE.

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DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

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LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

English Crop Prospects.

We have received a letter, dated London, April 26th, which refers to the growing wheat crop and future food prospects of England as follows: —

"The condition of the wheat crop —where there is a plant, of course — is very satisfactory, notwithstanding its exceptional backwardness; and, providing we have an ordinary rainfall in April and May, the advent of a hot, dry and forcing summer, should it occur, would not be against favorable results. In the case of spring corn, however, the possibility of such a contingency must now be a source of anxiety. Arrears of spring sowings are being fast overtaken; but the ground is too dry on top to make first-rate seed beds. The grain markets, during the past week, have been quite of a holiday character, and very little business has been done anywhere. There has been no actual difference in the tone of the trade between London and country markets; but, in the latter case, supplies have been, in many cases, so exceedingly short that prices have been maintained where otherwise they must have declined. In London, and other large port markets, this influence has been counteracted by the extraneous supply; and, at the present time, London and Liverpool are cheaper than most inland markets. English flour remains unchanged in value, but the retail trade is in a very languid condition. Barley continues very quiet, and values are quotably unchanged. Oats rule steady for good heavy samples, all others being in buyer's favor. The quantity of wheat on passage now stands at 2,502,500 qrs., and flour equal to 181,000 qrs. of wheat, an increase on the previous week's figures equivalent to 85,000 qrs. of wheat. California stands credited with 1,306,000 qrs. of wheat; Australia, with 346,000; the Atlantic ports of the United States, with 267,000; Chili, with 124,000; India and Egypt, with 111,000; Russia, with 71,500; and Danubian provinces, with 31,000 to direct ports and ports of call.—*Prairie Farmer.*

Wild Dogs.

That dogs are descended from wolves is the generally accepted theory of the origin of this race, which, in the past, has been so useful to mankind; but that they should exhibit a tendency to reversion has not been suspected. Civilized men are apt to become savages when placed in unfavorable conditions; and insanity and idiocy are supposed to be the turning back, as it were, of the human type to animal conditions which existed before men became civilized. Tenderly nurtured girls, who have been brought up with the greatest care, when insane, are foul of speech, and betray an acquaintance with wickedness which appalls their friends. These are called cases of reversion. Mr. W. D. Baldwin, of Shoe Heel, N. C., when riding through the woods, was attacked by a pack of dogs. They bit the horse he was astride, caught the bridle in their teeth, and made frantic efforts to tear him from his saddle. He finally got into town with the furious beasts at his heels. The citizens, with guns and pistols, came to Mr. Baldwin's relief; and the infuriated brutes were compelled to take to the woods. There is nothing curious in a dog getting mad; but that they should combine in a pack and all become furious together is a remarkable circumstance, and suggests that, perhaps, under certain conditions, dogs possibly might again show thier wolfish origin. The story is a curious one. By the way, in view of the horrors of hydrophobia and the millions of sheep killed by dogs, is it not a question whether the race of dogs is worth preserving?—*Demorest's Monthly.*

Young Men and Trades.

One of the errors accompanying our loose, liberal way of doing things in this country, is the raising up of boys and young men without teaching them any knowledge of manual labor, or of the practical principles of the mechanic arts. The number of young men in the United States who are now serving apprenticeship to trades of any kind is surprisingly small. Let our readers run over in their minds the names of all young men within the range of their acqaintance, and note how many of them are at work learning any useful manual labor; and then look at the farmer boys who, in about nine cases out of ten, leave their fathers' employ as soon as they can safely stand behind a smoking cigar and spit half way across the room. Then go among our carpenters and masons, contractors and builders: look at those only who have no gray hairs or furrowed faces, and you will find nearly all of them have "picked up" the trade. It was not thus half a century ago, and before that time.

Take the young men of to-day between the ages of eighteen and twenty-one, and not one in twenty of them can do any kind of mechanical labor. Such a thing as an apprenticeship is rarely heard of now. The boys in the country go off to some new place and teach school, drive team, help make railroads, or open mines. In cities and towns the boys grow up in idleness, save only the labor of attending schools. They are taught no kind of manual labor: they learn nothing but to play and dress.

Every young man ought to know how to use his hands as well as his mouth and brains. When he arrives at the age of manhood, he ought to be able to make a living for himself and his mother anywhere that work is to be done. He ought to be supplied with the capital which a good honest trade affords; and then he will not be compelled to "pick up" something, and always be a botch. When a boy comes up against the current of the "wide, wide world," he is apt to be swept away suddenly, unless he has the anchor of early labor training to lash himself to. * * *

Labor is the foundation of all wealth. Labor is honorable. A young man who is too proud to perform manual labor is too frail a plant to stand the storms of life; and he is of no practical value anywhere. Every boy ought to be taught some useful calling. Then, when he comes to look out into the big world around with a man's eyes, he has the means at command for earning an honorable livelihood. Go to work, boys. —*Topeka Capital.*

WE who have lived where lands are cheap and the soil fertile, cannot appreciate the advantages we enjoy above the crowded millions of Europe. Those millions are coming, and will occupy, cultivate, and develop our country. The second and third generations of our immigrants become as thoroughly Americans as any of us,—and do we not all trace our ancestry across the ocean? But the thrift and careful saving, the habits of economy and industry, especially of the Germans, leads them to aquire land, land everywhere. They are coming faster than ever this year: and, while we have plenty of room, it would be wisdom for the boys already here to look sharp for the cheap lands; for, in twenty-five years hence, it will be a much harder matter to acquire a farm than it is to-day. A good farm is the very best property a young man can get.—*Wyandotte Gazette.*

Reno township has one hundred and sixty-one dogs. There are seven families there who have no dogs.—*Leavenworth Times.*

Our Exchanges.

There are more tame grasses being sown in Morris county this season than during any previous year in our county's history. One party has put in one thousand dollars' worth of seed. General attention should be paid to tame grasses. Native pasture is on the wane.—*Morris County Times.*

The area of spring wheat in this county is about five thousand acres, or about half what it was last year. For the past five years, it has been gradually falling behind; and we predict that in five years more scarcely an acre will be sown, except in case of failure of the fall crop.—*Osborne County Farmer.*

Mr. L. Webster, of Dunlap, sheared his flock of one hundred thoroughbred Merino ewes last week, the fleece averaging over fifteen pounds per head. Mr. Webster considers this pretty good for eleven months' growth. He will begin shearing his large flock of grade Merinos about June 1st.—*Council Grove Republican.*

During the year 1880, the paupers of this county cost $5,809.99. On the seventeenth of last month, the poor-house was opened; and all paupers were ordered there. To-day the county is supporting four paupers at a cost of $2.25 each per week, or $520 per year; and three of these are talking of "going back to their wife's relation." —*Wellington Press.*

The dog ordinance has placed the city marshal under difficult obligations. He wants to rent a tight building for a dog pound, and hire a cowboy with horse and lariat to catch the dogs running around loose, so he can impound them according to the new dispensation, forty-eight hours; and then he will proceed to kill, bury, and draw his money.—*Arkansas Valley Democrat.*

Several farmers from the west part of the county were in Wellington yesterday, trying to enjoin the Santa Fe Railroad from taking up the rest of the track on the Anthony branch. Numbers have lost heavily. The company advertised for men and teams, and hired some 1,600 men. The Anthony people understood that the road was to be pushed. Cannons were fired, and lots sold at high figures. The men graded until nightfall, and then commenced tearing up the track, and were at it while the Anthony people were rejoicing. By Monday morning, they had it nearly all up.—*Champion.*

Co-operation Failures.

The failure of three more co-operative stores, in London, is announced. These concerns, it should be understood, were not based on the Rochdale plan, and were intended to benefit the middle class of people rather than the working people. Mr. Holyoke, the most eminent champion of co-operation in England, never approved of their method of doing business. The scheme was first popularized by the civil-service store, and afterwards adopted by establishments seeking the patronage of lawyers, doctors, military men, and latterly of the general public. The scheme is to sell goods to the members of the co-operative store association at lower prices than those charged at the ordinary shops. The Rochdale stores charge the regular market prices; and, at the end of the year, divide their profits among the members, who may, if they please, deposit their gains to swell the working capital of the concern, and receive interest. Co-operative stores run on this plan are found in all the English manufacturing towns, and number in all many hundreds. It is the Rochdale system that is copied in New York, by the association that has recently opened a store in Ninth street.—*New York Tribune.*

THE INDUSTRIALIST.

SATURDAY, MAY 21, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

The Introduction of Injurious Insects.

Many of our prominent injurious insects depend largely on man's assistance in their rapid spread to new localities. Insects are generally injurious, not in proportion to their size, but in proportion to their number. That some of our most injurious species are also among the smallest, is instanced in the chinch-bug, the Hessian fly, the wheat weevil, and the codling moth. These make up handsomely in numbers what they lack in size. In many cases, these and other insects would be only local in distribution were their spread dependent only on the unaided travel of the insects. They are mostly comparatively weak fliers, and might travel but short distances. This would seem to be the case with some larger insects: the cabbage butterflies, for example, are not what would be called strong fliers, yet the imported species, which first appeared, according to the statement of authorities, in Canada, in the year 1856, has now reached this vicinity, where they were collected last summer. That they did not spread this far unaided is evident upon a consideration of the records of their spread in Canada. In eight years after its first capture in Quebec, this butterfly had spread but forty miles from that city as a center. Its later progress southward and westward was, for awhile, at a rate about equal to this; and then we heard of it in Illinois, Iowa, and now in Kansas. At the rate of the extension of its range, as determined by its earlier spread from the initial point above mentioned, it would have reached Manhattan in about 250 years. Insects, like weeds and a bad character, follow man with a speed almost equal to his own. They are ready to accept any means of transportation offered. The frequent sudden appearance of some new pest in certain localities is, no doubt, often due to the railway train. The cabbage butterfly in question was, no doubt, assisted in its spread in this way, as well as by favoring winds. If the codling moth were at present unknown in this locality, its presence would soon become manifest through importations in apples shipped from infested localities.

In the collections of seeds brought home from Philadelphia, by the State Centennial Commission, I discovered four species of seed-infesting beetles that I had not previously observed in the vicinity of Topeka; viz., *Bruchus obsoletus*, or the bean weevil; *Tribolium ferrugineum;* a third species, a *Bruchus*, found in beans from Australia; and a fourth, name unknown, in peas from Egypt. Of these four species, the first two, at any rate, would find the locality congenial, and might have spread into the vicinity and become thoroughly naturalized. Two others I found first in seed distributed by the United States Department of Agriculture. These were the black barn weevil and the rice weevil, both very troublesome in stored grains, and difficult to eradicate when once established. Wood-boring beetles are often introduced in lumber or timber. I have not, however, noticed the introduction of any important insect by this means, as the lumber we import is usually of a kind not native here; and the borers thus introduced leave no successors, for lack of the proper food-plant in which to deposit their eggs. In many cases, of course, insects so introduced might fail to survive, through some inability to become acclimatized; but it is here again with insects as with weeds, the worst species show a wonderful ease in adapting their habits to the changed conditions incident to their migration.

The apple-root louse is found in some nurseries in the eastern part of this State, and probably occurs more generally there than this statement would indicate; but I have no direct knowledge of such general occurrence. I have received apple seedlings, for use as stocks in root-grafting, that were covered by the excrescences caused by this insect, and the insects themselves. By this means, and by the importation of young trees from eastern nurseries, the insect in question and many others,— as, for example, the scale-bark louse, the tussock moth, the bag worm, or the canker worm,— might become the destructive inhabitants of Kansas orchards, while by natural means the spread of either of the above-named species would be extremely slow.

This fact shows the necessity for attention to this point at the proper time. Infested seed or plants should be thoroughly examined before they are laid aside, in order to detect and destroy the insects or eggs found upon them. This caution should be exercised in each case, and every possible action taken to prevent the augmentation of our already large list of troublesome insects. *Prof. Popenoe.*

Weeds.

Ever since the fall of Adam and the additional curse pronounced upon Cain, weeds have been a great annoyance to the tiller of the soil. Weeds are like sins: they spring up spontaneously, and make a rank growth without the least culture. They only ask to be let alone. Like sins, they choke out the good seed, and prevent it from bringing forth valuable fruit. They are also like sins, because, if they are vigorously attacked while they are very young, they are comparatively easily conquered; but, if allowed to become well rooted, and to attain a rank growth, it is next to impossible to eradicate them. Surely, the enemy that sowed them is the Devil.

As weeds are allowed to exist, the only alternative left to the farmer is to wage an earnest and continued warfare upon them; and here, "time by the forelock" comes in to a great advantage; for, if the farmer is so behindhand with his work that the weeds have obtained a considerable start before he attacks them, he may hurry all summer, and still not be able to gain a complete mastery over them.

The trouble with many farmers is, too much time is allowed to elapse between the time of plowing the ground and that of planting the seed. The field is plowed, perhaps with some delays, or some hinderance on account of showers of rain, and is then harrowed and marked off. Two or three weeks have passed since the plowing began; and all this time the busy weeds have been preparing to show their heads, which they are just beginning to do. By the time the corn is up sufficiently high to cultivate, the weeds have completely covered the ground. Then comes the tug of war; and it is two chances out of three that the weeds will gain the victory.

A gentleman living a few miles west of Lawrence, who raises two or three hundred acres of corn every year, and who says he never fails to get a reasonably good crop, told me his plan was to start five or six plow teams about the 20th of April. Another team with a harrow immediately followed the plows, and still another with a corn-planter followed the harrow; and he never allowed the planter to be more than twenty-four hours behind the plows. He thus not only had fresh, moist soil in which to plant the corn, so that it will germinate well, but the corn came up before the weeds thought of starting. By the time he finished planting, on the 12th or 15th of May, his first planting was large enough to cultivate; and, by steadily running his cultivators for the next five weeks, he kept so far ahead of the weeds that they gave him very little trouble. By a frequent stirring of the soil, it is kept somewhat moist, even in a dry time, and he never failed to get a crop.

The farmer should also plan his work so that the labor will be somewhat enjoyable to him. Now, there is not much pleasure or satisfaction in cultivating a piece of corn that is overgrown with weeds. But, if the ground be free from them, and is mellow, he follows his cultivator all day with a good degree of comfort.

Many farmers, while they keep their cultivated fields moderately free from weeds, still allow them to grow along the fence-rows and about the barn-yard and outbuildings; and, perhaps, where, above all places, they should not be seen,— in the vegetable garden. This not only gives the whole farm a shabby appearance, but enough seed will ripen to stock the whole farm for the coming year. If the scythe is called into requisition a couple of times during the summer upon these places, this increase of seed will be prevented. The rapidity with which weeds will multiply themselves is almost astonishing. A single stalk of the cockle-burr may have upon it several thousand burrs, and each of the burrs contains two perfect seeds; and it is stated by some that one of these seeds remains sound, ready to germinate after the other one has produced a plant which has grown and died, and this fact makes it so difficult to clear a farm of them.

A few years ago, when Kansas farms were new, it was quite easy to keep down the weeds, for the land had not become seeded; but now more vigorous efforts must be put forth to keep them under. If the farmer is in earnest in his slaughter of them for a few years in succession, it is much easier for him to keep control of them than it is when they are allowed to have sway for a single year. This year, so far, bids fair to be one favoring the rapid growth of weeds; so let us double our diligence, when the weather is favorable for destruction. The plowing of stubble fields in the latter part of the summer will cause the death of myriads of weeds which otherwise would thoroughly seed the field.

Weeds, after all, in one sense, may be a blessing; for they compel the farmer to stir his ground so frequently that he raises a better crop than he would otherwise do. This frequent stirring, the farmer would be too lazy to do if it were not for weeds.— *Prof. Platt.*

THE fifth number of the new magazine, *Education*, besides the editorial matter, contains eleven vigorous papers on important educational topics. We have read all of them with interest and profit. In our opinion, No. 5 is the best number that has been issued. Prof. Maria Mitchell, of Vassar College, in a paper on the "Collegiate Education of Girls," says this of college commencements: —

"I hope the time will come when colleges will be able to give up the pomps and parades of public days. Why should the conferring of degrees at commencement be heralded by noisy music? Is the college commencement a *necessary* evil? Girls need no stimulus to work. The commencement exercises are in the thoughts of an ambitious girl from the time she enters college until she graduates. The 'part' at commencement haunts her: the college degree, she feels, is sure; but, for the sake of the loved ones at home, she hopes and works and prays for what she considers the 'honor.' Is it a healthy influence?

"There can be no other motive for great gatherings than that of indirect advertising. The guests that come to the college see nothing of its methods of working; they see the college building and its inmates in full dress; they know nothing of the unremitting, hard, conscientious study that is done behind the scenes."

Educational Gossip.

The teachers of Labette county held a well-attended picnic last Saturday.

Nearly four hundred professors have visited the Holton school this year.

The Oswego *Independent* publishes a well-prepared educational history of Labette county.

The semi-annual meeting of the State Horticultural Society will be held at Winfield, on the 7th, 8th and 9th of June.

D. C. Tillotson, of Jefferson county, recently principal of the North Topeka schools, has been elected superintendent of the city schools of Topeka.

The public schools of Atchison will close on the 7th of June, for the summer vacation; and, on the evening of that day, the graduating class will receive their certificates, at Corinthian Hall.

"Some of our citizens, by small contributions, have purchased a handsome collection of minerals from Mrs. Robinson, of West Wichita, whose husband died in Colorado, a year ago. The cabinet has been on exhibition at J. P. Allen's drug store for some weeks. It was presented by the contributors, to the library association. It is small; but it will be a great nucleus for a large collection, not alone necessarily of minerals, but of the precious stones of Colorado, and of curiosities from all quarters.— *Wichita Beacon.*

Sup't H. K. McConnell, of Osage county, answers the request of a teacher to be examined on some other time than Saturday (his Sabbath), by promising him a separate examination, if he would pay the expenses. The letter is an interesting document, which, but for its length, we would give in full. We extract: —

"To give you the examination you ask for will cost at the least calculation $16, to be paid out of the county treasury, from money collected from the people by tax. Now for my question: Have we a right to use the people's money to pay for the exercise of your religious liberty? Nothing can be further from constitutional law and right. We are prohibited from nothing more absolutely than from this. Society is not responsible for your peculiar religious views, and can neither in law nor right be held to pay for what results from them. When you and I conclude upon a certain line of personal belief and action, we individually assume all the responsibilities for what these things superinduce. You say, with your peculiar views you cannot be farm-hands, clerks, employes on public works, miners or school teachers; and hence you are forced out of the county. No, not especially out of Osage county, but out of the whole business world. You are entirely correct in your statement that your religious views of the Sabbath shut the doors of all the industries in your face. Now, can a belief that puts you out of joint with all the world, that logically followed out must destroy reason and life itself, be a correct one? Suppose you hold a theory of human anatomy, but when you apply it to the arrangement of the human body, it brought the *os coccygis* with the *medulla oblongata*, would you not take a hint therefrom that the theory was at fault? * * * I cannot prove to you that your theory of the Sabbath is wrong, because I have no evidence. The subject is equally barren, however, of evidence, pro and con. On the whole range of chronological subjects, our best body of biblical scholars and critics agree that the best proven fact of all is, that we are from four to six years, at least, wrong. Now, if we lack from four to six years of fixing a date, why stickle for a day? Is it because Saturday is the "seventh?" Then why do you not begin to count with Monday, and so find Sunday to be the seventh, and thus put yourself in harmony with the body of society, for the want of which you admit you are driven well-nigh to desperation?"

THE INDUSTRIALIST.

SATURDAY, MAY 21, 1881.

Rainfall for the past week was 3.97 inches.

The regular public hour of Friday afternoon was occupied by Prof. Popenoe, who gave an able and instructive lecture on the mutual relations of plants and insects.

The Kansas Spirit has recently changed hands, Mr. J. W. Stevens retiring, and Messrs. Moody & Dani assuming editorial control. We wish the *Spirit* nothing but success.

Some little Berkshire pigs, just two months old, were weighed at the barn this week. They "tipped the beam" at an even seventy pounds. Very fair this for little Berkshires.

The rains of the week have been remarkable on account of the large amount of water (nearly four inches) which has fallen, and because it has fallen in such a way as to be absorbed almost entirely by the soil, the creeks showing but very slight increase of volume.

Low Dow, a diminutive but very sharp Chinaman, was on the Hill Thursday, soliciting the privilege of lecturing before the students. Low, however, failed to furnish the necessary credentials, and was denied the sweet privilege of airing his "heap much talkee benefit student allee same."

Senator S. S. Benedict, of Guilford, Wilson county, has accepted the invitation to deliver the annual address at the forthcoming Commencement exercises of this College. Senator Benedict won an enviable reputation in the Senate last winter; and those who expect a valuable address will not be disappointed.

Wirt W. Walton, escorted by the Hon. Geo. S. Green, looked over the grounds and through the College buildings on Saturday last. It is not necessary to tell any man, woman or child in Kansas who Wirt Walton is; but it may not be superfluous to remark that his paper, *The Dispatch*, is one of the very best county papers in the West. Come again.

The College is indebted to Prof. F. H. Storer, of Bussey Institution, Massachusetts, for the *Bulletin of Experiments and Researches*, issued in occasional parts since 1874; also, to President Levi Stockbridge, of Massachusetts Agricultural College, for various numbers of the annual report of that college, needed to complete the set in the President's office.

Major J. K. Hudson, Secretary of the State Board of Agriculture, and proprietor of the Topeka *Capital*, and an old-time regent of the College, gave us the pleasure of a visit on Wednesday last. The Major gave the students a pleasant talk in chapel, and then looked over the different departments, expressing pleasure, meanwhile, at the growth of an institution in which he has taken such active interest.

Putting this and that together,—a new dress of type, a bran new and very stylish phæton, and now a sudden blossoming out into a full-fledged seven-column octavo,—and we are forced to the conclusion that the *Nationalist* is a mine of wealth to its present owner and editor, the Hon. Albert Griffin. This circumstance ought to encourage every poor editor in the State who has a mind of his own, and is not afraid to speak it.

SOCIETY HALL, May 14, 1881.

Webster Society called to order by President Mason. After roll-call, the question, "*Resolved*, That all railroads should be owned and controlled by the government," was discussed by Messrs. Bailey and Markcum on the affirmative, Messrs. Knaus and Thompson on the negative. The debate was quite interesting, and decided in favor of the negative. Extemporaneous speaking was quite animated. A declamation and select reading was then given by Messrs. Meek and Reeve respectively. The Chinese question will be discussed next evening. The *Reporter* will be presented by Mr. M. T. Ward. After report of critic and reading of minutes, the Society adjourned. A good time is anticipated at next meeting, and we invite everybody to come.

ST. AUGUSTINE.

SOCIETY HALL, May 20, 1881.

Society called to order by the President. Devotion by Mr. Kern. Roll-call. The music committee favored the Society with a very beautiful piece entitled, "Patriotic Glee," accompanied by a base viol and violin. Question for debate was ably discussed by Messrs. Copley and Short, and the Misses Coburn and Campbell. The judges decided in favor of the negative. Extemporaneous speaking was very interesting, and Conkling's conduct and the Democratic party were thoroughly discussed. Under the head of miscellaneous business, provision was made for payment of the balance due on the pictures. Debaters next week, Miss Quinby and Mr. Cottrell. Question, "*Resolved*, That war has done more injury to the world than intemperance," "Nearer home" was then rendered with good effect. Adjournment. HOMBRE.

COMMENCEMENT.

The exercises of Commencement week will be conducted according to the programme given below:—

The baccalaureate sermon will be preached by President Fairchild, on Sunday evening, June 5th, the services beginning at 8 o'clock.

On Monday and Tuesday, June 6th and 7th, from 8:50 A. M. to 1 P. M., term examinations will be held in the several class-rooms and shops.

On Monday evening, a musical entertainment and social will be held in the College chapel.

The annual address will be delivered by S. S. Benedict, of Guilford, Kas., at the Presbyterian Church, on Tuesday eve. The exercises commence at 8 o'clock.

The Commencement exercises will be held in the Presbyterian Church, on Wednesday, June 8th, beginning at 10 A. M.

The Alumni reunion will be held at the College, on Wednesday afternoon. The exercises begin at 3 o'clock.

Corvin J. Reed writes us from Portland, Oregon. He is transit-man of an engineering party. He says "I find my college course, besides a great satisfaction, is of pecuniary benefit to me." Mr. Reed has been in Oregon about three months, and is quite enthusiastic over the country.

Sup't Graham, in an interesting article in the INDUSTRIALIST, on the Mound Builders, says, "that the club has opened twenty-seven mounds lately, and discovered many interesting relics of a prehistoric race." He thinks that the practice of cremation was followed by the Mound Builders.—*Waterville Telegraph.*

We made a hasty visit to the State Agricultural College, at Manhattan, a day or two since, and found the institution in a most flourishing condition. The central building, for which an appropriation was made last year, is under contract; and the foundation walls are being rapidly built. The fields, orchards and stock are in good order, everything denoting care and intelligent attention. This splendid school offers opportunities for the young men and women of Kansas to secure a thorough and practical education. Our citizens who have not visited this institution recently, cannot comprehend the value and importance of this College as one of the things Kansans have a right to be proud of. A better knowledge of the school can be had by addressing President Fairchild, at Manhattan, requesting the catalogue giving course of study, methods, etc. We wish every farmer in Kansas could spend a day or two examining this school. There are new ideas there worth the time and attention of all who have boys and girls to educate.—*Capital.*

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil, climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

G. Adams

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, MAY 28, 1881. No. 41.

KANSAS STATE AGRICULTURAL COLLEGE.

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THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

The Cow Pea.

The cow pea is worthy of being introduced to every farmer. Its value as an article of food for man and beast, the large crops of fodder (bushy vine) it produces, its adaption to the lightest and poorest soils, and its usefulness as a manurial crop, places it far above many other plants that are grown to its exclusion. It has no enemies among the insects, and is in that particular free from damage. A heavy crop of it will so completely cover the ground, that not even a ray of sunshine can enter; and it is often necessary to pass over the vines with a heavy roller, in order to get them plowed under. From twenty to forty bushels of peas are usually produced to an acre; and, if they have been well manured previous to seeding, the crop of hay will be very large. One of the most important advantages the pea confers on land is the shading it gives; some experianced farmers contending that, by this method, it rather improves the land than injures it. A small outlay will enable any one to try the cow pea, and those who have not grown it should do so.

The cow pea, though called a pea, is properly a bean. It will grow on soil that scarcely produces anything; but is, however, sensible to the effects of good manuring, and rewards the farmer for such treatment with bountiful yields. It is indigenous to the middle States and the South, preferring a warm season and a dry soil. There are a great many varieties of it, the most prolific being the Crowder; but the "black-eyed" is preferred for the table.

As a renovator of the soil, next to clover, it has no equal. Growing with a heavy, dense foliage, plowed under just at the period of blossoming, it makes a splendid, green manure, rotting quickly and producing lasting effects. It can be grown for this purpose on land that will not produce clover; and that is a very important item. On inferior land that had a crop of peas turned under, if a light sprinkling of lime is added, a venture may safely be made with clover the following year. It is planted about the same time as corn. It can be sown for hay, but care must taken be in harvesting it If allowed to get too ripe, the leaves will crumble off after it is stowed away in the loft; but, if cut when in full blossom, or just as the pods begin to form, and then cured like ordinary hay, it will keep all the winter. Cows eat it with relish; and for sheep nothing is equal to it: they eat it up clean, being very fond of it. The seeds are more nutritious than our ordinary white bean; stock preferring it when cooked to corn or meal, while calves are raised on them with ease when it is desirable to wean early. For the table, they are cooked, not only when dry, but also when green, being a favorite dish on Virginia and Carolina tables. There is a prejudice against it on the part of those not familiar with it, on account of the dark color it takes when cooked; but, if the nutritious qualities were fully known, no difficulty would be experienced in making it a staple article of food.—*Colman's Rural World.*

THE daily newspaper press of this country is something stupendous. The statistics on the subject, issued from the census bureau, show that the total number of dailies is 962, including 80 suspended and 114 established. The aggregate daily circulation is estimated at 3,581,178; the annual circulation, 1,127,337,355. For this vast issue the people pay out annually $26,250,000. When it is remembered that there are more than 10,000 periodicals published in the United States, it will be seen that this sum is only a part of the enormous amount of money spent for reading matter of this kind.

The Smoothing Harrow.

Will you please inform me what points of the Thomas Smoothing Harrow are covered by letters patent? And is there any risk to farmers in making slanting-tooth harrows for their own use? or will using the teeth from one in another frame be an infringement?

E. B., Merchantville, Ill.

Teeth for harrows slightly inclining backward were made many years ago in England; but the smoothing harrow was the first which had teeth inclining backwards nearly 45 degrees, so as to cut downwards through clods instead of pushing them forward, and cutting and grinding spread manure in the same way. This mode of operating also rendered it safe for harrowing wheat and corn broadcast, by not tearing up the plants, while it pulverized the surface, and ground up the small weeds which were just making their appearance. The fact, however, that some slant had long before been given to harrow teeth, prevented this essential part of the smoothing harrow from being patented, as we have been informed; the patent covering only the peculiar form of the frame and insertion of the teeth. Any farmer or manufacturer, therefore, as we learn, who sets slanting teeth in another kind of frame, is not liable for any infringement. The object of the inventor, in devising the peculiarity of this harrow, was more for the sake of introducing an important improvement than for securing any monopoly; all the value of which, as often happens to inventors, was obtained and held by the manufacturers.—*Country Gentleman.*

Small Savings—Small Losses.

The man who saves something every year is on the road to prosperity. It may not be possible to save much: if not, save a little. Don't think a dollar or a dime is too small a sum to lay by. Every body knows how little expenditures get away with large sums. But few seem to know that the rule is one that works both ways. If a dime spent here and a dollar there soon makes a large hole in a man's income, so those dimes and dollars laid away soon become a visible and respectable accumulation. In this country, any man may make himself independent, or keep himself under the harrow for life, according as he wastes or spends his small change. How many things do individuals and families buy, that they do not need, or can not afford. Think twice before you spend that small coin. Don't be stingy or mean, but also don't be foolishly self-indulgent. The self-indulgent person is far more likely to be ungenerous than the self-denying one. The money wasted on hurtful things alone,—the drugs and medicines we mingle with our diet in the forms of tea, tobacco, alcohol and the like,—stand on the very threshold of prosperity, and bar the way of thousands to a home in their old age.—*Rural New-Yorker.*

A Parcel Post.

A parcel post has jusi been established in England by Postmaster-General Fawcett; and an international agreement has recently been completed between France, Germany, Belgium and Switzerland for a parcel post bost between these countries. In both instances the post-office proposes to do a general express business at a fixed charge for packages up to a certain weight. In France, this charge is to be twenty-two cents for packages up to six pounds in weight, and not over twenty-four inches square in any direction. This is altogether different from the postal charge for carrying merchandise in this country, which is so arranged as to give the express companies the profit on the short distances, and the government the losses on the long ones. The French charge is only for railroad points, an increase of fifty per cent is made for deliveries at a distance from railroad stations; but, however arranged, a parcel post should be run as a part of every postal department.—*Leavenworth Times.*

Our Exchanges.

An Indian chief, after the romantic manner of his nation, calls his musket "Book Agent," because it is an old smooth-bore. *Kirwin Independent.*

The country boy who used to come to town, drink a glass of beer and imagine he was tight enough to be a base drum, will now have to find some other way to raise hades.—*Burlington Patriot.*

There seems to be a general failure of the early planted corn; and a large number of the farmers will have to replant their ground. The germ in the kernel, in corn that was exposed, is black; and the corn rots in the ground.—*Onaga Journal.*

Early this morning two men came into the city, from their farms twenty-three miles southwest, in search of a physician and a "mad-stone." Last Saturday, one of the brothers, D. A. Jones, was bitten on the arm by a dog, but thought nothing more of it until Monday, when the animal showed unmistakable signs of having the *rabies*,—snapping at other animals, etc.; and a cow which it previously bit is showing peculiar signs of teeth-poison.—*Wichita Republican.*

A light rain, one-half of an inch, is equal to fourteen thousand gallons, or fifty-six tons, of water to the acre. Plants can take their food only in a state of solution; and, where manure is spread upon the surface at the rate of eight tons to the acre, half an inch of rain would furnish a gallon of water to each pound of manure. This would dissolve all the plant food in the manure and reduce it to a condition to be taken up by the young roots. But, if the manure is plowed under to the depth of six or seven inches, it would take an immense rain to reach it.—*Grange Bulletin.*

Dodge City this season promises to be an important sheep market. Already we hear of thousands of sheep that will be driven from New Mexico, and which will arrive at this point about the first of July. New Mexico sheep-raisers realize the fact that they must give up sheep-raising. A majority of New Mexico sheep will therefore be driven to Kansas, and the most accessible and marketable point will be Dodge City. The range in New Mexico is being contracted and encroached upon by cattle; and sheep-raisers are unable longer to find the wide range they were so long accustomed to use. —*Dodge City Times.*

Alfalfa, now growing on our place adjoining town on the south, was sown last year on the 21st of May. During the dry season, we supposed it was entirely killed by the drouth. This spring it started so as to make pasture four weeks before the prairie grass, and now shows a growth of thirty inches. Many intelligent and successful farmers have examined it and pronounce it the thing for this country. Capt. Smith, of Cottonwood Glen, has this season sown one acre, and reports it as doing finely. Mr. E. B. Rishop, two and a half miles east of town, has been raising it for several years, and pronounces it a great success for this country. It is by no means too late to sow it yet. Let every pound that can possibly be procured be sown, and thus secure s start for plenty of seed. The seed is bound to be in great demand for several years.—*Lincoln County Beacon.*

THE INDUSTRIALIST.

SATURDAY, MAY 28, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Commencement.

The Twelfth Annual Commencement of the Kansas State Agricultural College promises to be an event of great interest; and we take this occasion to invite the readers of the INDUSTRIALIST, as many as can make it convenient, to be present at this annual gathering. The general programme is as follows: —

Sunday, June 5th, 8 p. m.—Baccalaureate Sermon, by the President.

Monday, June 6th, 7:30 p. m.—Musical entertainment and social.

Tuesday, June 7th, 8 p. m.—Annual address, by Hon. S. S. Benedict, of Guilford, Kas.

COMMENCEMENT DAY,—*Wednesday, June 8th.*

10 a. m.—Exercises of the graduating class.

3 p. m.—Alumni Reunion. Address, by William D. Gilbert, Class of '74.

The annual examinations will be held on June 6th and 7th, in the several class-rooms and shops, from 7:40 A. M. to 12:10 P. M. of each day.

THE rage for fashionably bred Jerseys promises, or perhaps we should say threatens, to equal the fever for Short-horns, which culminated in the New York Mills sale of 1873. At the sale of Jersey stock, the property of Mr. J. D. Wing, held in New York, May 5th, the highest prices ever paid for this class of stock were obtained. At this sale, five cows sold for $1,000, $1,200, $1,258, $1,550, and $2,000 respectively. For three bulls, $560, $600 and $4,500 were obtained, the last figure having been paid for the bull Polonius, of the "Alphea" strain, which means that he is directly descended from the cow Alphea, said to have given a yield of 25 lbs. of butter in one week. The average price of 40 cows and heifers disposed of at this sale was $451.20, and of six bulls and bull calves, $942.50.

The Southern Cow Pea in Kansas.

In another place, we publish an article on the southern cow pea, a peculiar southern product that will be remembered by many old soldiers of the war of the Rebellion, but which is to most Kansas people an entire stranger. We refer to this subject here more particularly to say that the cow pea flourishes abundantly in Kansas, giving very large yields both of peas and vines. We last year cultivated something over an acre upon the College farm, employing two sorts,—the "black" and "clay" varieties. They made a rapid growth from the start, enduring the dry weather and great heat of midsummer remarkably well. Late in summer and early fall, by their peculiar creeping habit, they covered the ground with a dense growth of vines, leaves and tendrils. Several of the numerous varieties of the cow pea are superior for table use; but their chief value, we apprehend, will be to furnish food for animals, in the shape of peas, or, more properly, beans and hay.

The cow pea should not be sown until the warm weather has fairly set in, and not later than the middle of June. Where the object is the growth of vines for the hay they afford, or where it is desired to plow under the foliage for the sake of the large amount of green manure which this plant furnishes, the peas may be sown broadcast, and need no further attention until the harvest time. But where the object is the growth of the peas, we should prefer to cultivate in drills about thirty inches apart, stirring the ground occasionally with the cultivator during the early stages of the plant.—*Prof. Shelton.*

The Carp.

The carp (*Cyprinus carpio*) was introduced many centuries ago into Europe, from its native waters in central Asia. In Austria, the culture of the carp in ponds can be traced back to the year 1227, and in England to 1504. Since its introduction, this fish seems to have been very generally cultivated, and to have had an immense popularity almost from the first. The Emperor Charles IV., of Germany, granted privileges favoring its culture in his domains; and the monks, who were especially devoted to this kind of stock-raising, with the princes of the time, established very large ponds for this purpose. Near the town of Wittingau, in Bohemia, in the year 1367, were established, upon a single estate, ponds of considerable extent, which, with the exception of the time during the thirty years' war, when they suffered considerable damage from neglect, have been continuously productive; and they have grown in number and size until, at the present, they cover some 20,000 acres, and produce 500,000 pounds of carp per annum.

The carp has not only been cultivated in ponds all over the continent of Europe; but it has become a common fish in most of its rivers. This variety in its culture, continued as it has been through centuries, has given rise to not less than three distinct species; viz., the scale carp (*Cyprinus carpio communis*), which is entirely covered with scales; the mirror carp (*Cyprinus carpio specularis*), having three or four rows of very large scales along its sides, but none elsewhere; and the leather carp (*Cyprinus carpio coriaceous, sive nudus*), usually without scales or with but few upon its back. Of these three kinds, preference can be given to neither. As has been stated, this fish lives in both ponds and rivers; but it greatly prefers stagnant water, and will live in ponds where other fish could not possibly exist.

Its habits are somewhat peculiar. It grows during the warm months of the year, and remains dormant, with its head buried in the mud, and without losing any of its weight, during the winter. Its natural food is worms, larvæ, and the seeds and roots of aquatic plants; but when fed, it is omnivorous, and will eat meat, cabbage, boiled potatoes or grain, and is particularly fond of the seeds of some plants which grow wild in this country. The State of Kansas is peculiarly adapted to carp culture. Besides natural advantages in the shape of numerous ponds and lakelets, which produce thousands of insects and plant seeds, its natural food, and which are deep enough to afford protection to the fish from freezing in winter, the general undulating surface of the country offers great facilities for the establishment of artificial ponds; and the long summers and the usually mild winters are very favorable to rapid growth.

In locating an artificial pond, or converting a natural one to this use, a few things must be considered. There must be a sufficient supply of water at hand to keep the depth of the pond the same during the entire year; and the pond must be so located that it will not be in danger of an overflow. Sandy or gravelly soil is of small use unless it contain a very considerable mixture of loam and clay. Spring water direct from the ground is not favorable: it should be allowed to run some hundreds of yards, that it may become warm before entering the pond. If the pond is very deep, it will be unfavorable, for the reason that the water will be colder and will not afford so many insects as it otherwise would; also, the fish do not grow so rapidly in cold water. A depth of three feet in the center, with a considerable margin of shallow water from six inches to a foot and a half deep, is about right for a pond. If a hole six or eight feet deep is made in the pond for winter quarters, the fish will be safer.

Feeding should not be resorted to, except in very small ponds,—an acre or less. If the pond is a natural one of considerable extent, and is properly stocked with about eight hundred fish to the acre, it is only necessary to see that there are plenty of plants in it, such as water grass (*Festuca fluitans*), which not only affords food for the fish, but their leaves are well shaped to receive the eggs to which they adhere until hatched. The white and yellow water lily, and wild rice, and water oats or Tuscarora rice, afford an abundance of seeds which are eagerly sought after. If the fish finds food in abundance, its growth is quite rapid; and, although the period of its growth is confined to the warm months of the year, it attains a weight of three pounds in two years.

The carp is in no way predaceous; but, at times, it is given to eating its own eggs. This is prevented by either removing the eggs or the fish to another pond, or by taking care to feed during the spawning season. By sinking boughs of cedar or some other evergreen in the shallow parts of the pond, during the spawning season, the eggs, being adhesive, stick to the twigs, which may be removed to other water and hatched. Or the pond may be so constructed that the water may be drawn off and the large fish removed, after spawning.

The wonderful powers of reproduction possessed by this fish; the ease with which it is cared for; the delicacy of its flesh, which almost equals that of the trout or bass; and its rapid growth,—are qualities which strongly recommend it to farmers. It will grow in a mill-pond, although this is not suitable for the most favorable results, on account of its liability to overflow. A horse-pond or a small stream dammed up, is an excellent place for it, provided there is a ditch cut beside it to accommodate the surplus water during freshets. It will grow in the garden, and thrive wonderfully upon the refuse of the kitchen and barn-yard, if the water can be kept at a proper depth. With a suitable pond upon his farm, the owner can, with no more trouble than that necessary to raise a coop of chickens, add a dish to his bill of fare that would delight an epicure; and, with both a carp pond and a chicken coop, he ought to be able to keep his table supplied with fresh meat at all times.—*Sup't Graham.*

Short-horn Sales of 1880.

The last number of the *Country Gentleman* contains the usual annual statement of Short-horn sales of the previous year. In the list before us, the sales are classified by States; and the list seems to be complete. The tables showing the summary and record of previous years we copy below: —

GENERAL SUMMARY FOR 1880.

	No.	*Average.*	*Total.*
Kentucky	738	$173.47	$128,017
Missouri	984	103.03	101,385
Illinois	500	144.06	72,028
Ohio	265	107.95	28,608
Iowa	314	105.20	33,032
Wisconsin	98	162.70	15,945
Connecticut	37	104.60	3,870
Minnesota	60	153.00	9,180
Pennsylvania	11	146.64	1,613
Kansas	44	161.00	7,090
Nebraska	75	138.53	10,390
California	8	146.25	1,170
Canada West	45	290.00	13,050
Cochrane & Cannon	43	900.00	38,700
	3222	$144.00	$464,078

OUR RECORD OF PREVIOUS YEARS.

Sales of 1879	2,865	$115.00	$326,186
do 1878	2,048	155.00	317,448
do 1877	3,237	230.00	742,871
do 1876	4,004	841.00	1,366,805
do 1875	4,347	422.00	1,832,383
do 1874	2,676	385.00	1,031,053
do 1873	1,836	532.00	996,527
do 1872	1,014	313.00	317,625
do 1871	407	290.00	117,914
do 1870	495	343.00	169,557

During the eleven years included above, our recorded sales of Short-horns have reached an aggregate of 26,151 head, which have realized in the ring a total sum of $7,682,439,—being equal to a general average of a fraction short of $294 per head.

Educational Gossip.

John Sullivan, of Wamego, has been selected as a cadet to West Point.

A man at Clyde was recently fined $20 and sentenced to two months' imprisonment for brutally beating his child.

Bismarck Grove will be illuminated by electric light, during the time of the fair next fall.

No one can become a successful teacher without great labor and preparation, yet there are many who will never succeed well who might succeed in other professions.

Members of the Faculty who failed to plant trees last Friday have been called upon to make a speech on some agricultural or kindred topic. Prof. Saddler delivered a fine address last Tuesday morning; and the students are anxiously awaiting to hear from Prof. Sogard, whose theme is understood to be wheat.—*Emporia Ledger.*

And still they come. The Plainville *News* says: "Miss Ida M. Tillotson, formerly one of the brightest young school ma'ams of this county, was admitted to the bar in Graham county, at the recent term of the district court in that county. She is said to have passed a very creditable examination, and is the fourth lady admitted to practice in the courts of this State.

Sup't Mitchell, of Pottawatomie county, lectures his fellow citizens, on his observations during the round, in the following forcible manner: "I have found but three houses that had been thoroughly cleaned this spring. School boards should see that the houses are clean and supplied, as far as possible, with suitable apparatus, at the beginning of each term. I find but few copy-books. This is not as it should be. Nearly every district board in the county adopted a series of copy-books; and these should be used in compliance with the requirements of the law. The schools showing the greatest advancement are those in which pens, holders, ink, paper and copy-books are furnished by the board for the use of the whole school. Some children lack the necessary books, and parents should supply them immediately. District officers and parents should take the time to visit the schools frequently; for, by the interest they thus manifest, they cheer the teacher, and encourage the pupils to put forth greater exertions to obtain a good education. Another great obstacle in the way is the irregular attendance. For this, parents are to blame. They should endeavor to keep their children at school every day of the session; and, when it becomes necessary to keep one or two of the children at home, see that the others are in their places at school. I find some of the houses almost ready to tumble down, and others too small. These should be replaced by new ones. A good omen is the growing feeling in favor of retaining the same teacher for a number of terms. Many districts have thrown away hundreds of dollars, and wasted years of precious time, in constantly changing teachers. While the new law is intended to give us better qualified teachers, districts should engage them for longer terms; and both parties will be benefited.

THE INDUSTRIALIST.

SATURDAY, MAY 28, 1881.

Class reception at the President's next Tuesday evening.

Visitors will notice the improved appearance of the shelving in the College Library.

The catalogue for the present year is expected to be ready for delivery by the time of Commencement.

Miss Wright, of Brookville, who is on her way to join a missionary station in Armenia, Turkey, stopped off at Manhattan, on Monday, to visit College friends.

Yesterday Mrs. Cripps, assisted by her class in cooking, served up, in the new kitchen, an excellent luncheon, which was patronized by a large number of students, and heartily enjoyed by all.

The last regular meeting, for this season, of the Scientific Club, will be held at the Laboratory next Friday evening at the usual hour. Among the several papers to be presented, there will be one on "Glaciers," by Prof. Walters. Let all attend.

An extraordinary, or, as it is sometimes called, a special, session of the Webster Society will be held on Saturday evening, June 4th. One of those "good times" that the Websters always have on such occasions is expected. Everybody invited.

After one has taken a miscellaneous assortment of old tin cans and two sections of a dilapidated pants' leg from a well from which he has been in the habit of taking his liquid nutriment, he feels in his inmost self that this amendment business is a snare and a delusion.

The *Southern Live-Stock Journal*, published at Starkville, Mississippi, is the latest addition to our exchange list. This paper is a handsome seven-column quarto, and is an earnest and able advocate of farm improvement. Those of our readers who may be anxious for trustworthy information regarding southern crops and methods of culture, should subscribe for the *Southern Live-Stock Journal*. The subscription price is $2.00 per year.

Last Wednesday, a portion of the library belonging to the Manhattan Institute, was transferred to the shelving recently placed in the College building. In all there are about 375 volumes, most of them being United States public documents; the most valuable of which are the reports of the Pacific railroad survey and the Annals of Congress from 1789 to 1824. These books are not donated to the College, but simply placed in the charge of the College Librarian.

SOCIETY HALL, May 27th, 1881.

President Jeffery being absent, Society was called to order by the Vice-President. As the debaters on the affirmative were absent, the Society was divided, and all took part in debating the question, "*Resolved*, That war has done more injury to mankind than intemperance." Mr. Marlatt, our Webster visitor, was appointed judge, and decided in favor of the negative. Miss Fairchild read us a well-prepared essay. Treasurer reported contributions to the amount of one dollar and sixty cents toward paying the bill for glass for pictures. An interesting meeting is expected next week; and it is hoped that all members will be present. CO-SINE.

The wet weather at present prevailing over a large part of the State, is very discouraging to consumptives and new-comers who have been deluded into removing to Kansas by the glowing newspaper accounts of our "dry climate." It is within the power of our exchanges to give much information that will tend to reassure these poor, deluded people. For example, it might be well to keep standing for a few weeks, in all of the local papers, an item to the effect that the rain always "lets up" a sufficient length of time to admit of harvesting the crops in good condition; but we hope that no one will so far stray from the truth, with the object of securing for his locality an unfair advantage in the matter of immigration, by claiming perfect immunity from the rains which annually deluge Kansas from center to periphery.

The near approach of vacation suggests the fact, that we have some things to be thankful for as well as the rest of mankind. Not the least of these "prospective mercies" will be our emancipation from the tyranny of that awful medley of noises,—the joint or special product of the piano and viol minor and major,—which escapes from the musical end of the Mechanical Building, more or less, at all hours of the night and day, Sundays only excepted. Occasionally, as for example when the band is "tuning up," or in the preliminary flourishes to a piano duet, the "music" is endurable, if not positively enjoyable; but, when that piano is in the agonies of the "Maiden's prayer," or "The mocking bird with variations," one feels like calling on the rocks and mountains to end a miserable existence.

The Class of '81 has been photographed. Now, this, considered as a fact, is neither new nor remarkable; neither is it mentioned on account of any real or imaginary effect it may have upon the community. The negative has not been copyrighted, and the positives are not for "gratuitous distribution." Mr. Burgoyne, the prince of artists, pronounced the negative the best he had ever taken, which, by the way, some one very impertinently suggested *was* remarkable. By a great deal of practice and considerable poising, that appearance of "dignity" that is so prominent a feature of those photos is truly astonishing, and that's "positive." Fault can be found with the picture of course, especially by those young men whose mustaches failed to make their appearance after the application of the deadly cyanide. On the whole, the photos are very superior; and we know of nothing better calculated to call up college recollections, with their many pleasant associations, than good class photographs, and these fill the bill in every particular.

The Class of '81 is making strenuous efforts to enjoy itself. Picnics, sociables, suppers, and other *et cætera* of Commencement, succeed each other in a manner quite remarkable. But of all the pleasant times the class has had, the most truly enjoyable was Mr. U. G. Houston's class reception on Monday evening, the 16th inst. Driving from 4 o'clock till 5:30 P. M., supper at 6 o'clock, and a social gathering in the evening, made up the programme, "which was strictly adhered to." But that supper: nothing can compare with it but an old-time thanksgiving dinner, which, in our "youthful" days, always marked the beginning and end of each year. Most of the class are "baching" it; and having, through three years or more of self-denial, worked up an appetite that would frighten an United States commissary, it would be superfluous to add that the class did justice to the occasion. If Mr. Houston does not know how to entertain company, and "feed Senior bachelors," we pity the financial condition of the one that does make a success of it. If any one should be invited to the Houston mansion, and should claim that he was not entertained in the most hospitable manner, we should be compelled to believe that something was radically wrong in his psychological make-up. D. S. L.

Hon. S. S. Benedict, of Wilson county, regent of the State University, and Senator from his district, has been invited to deliver the annual address before the Agricultural College students at the June Commencement. The farmer's school will have something vigorous and practical, if the honorable gentleman accepts the invitation, Benedict is probably the best educated farmer in Kansas to-day.—*Clay County Dispatch.*

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. F. M. JEFFERY, President.
MISS GRACIA POPE, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
S. C. MASON, President.
R. A. HOLLENBERG, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere: —

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*— History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil. climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.— General principles governing the development of domestic animals. The laws of heredity of disease,— of normal, abnormal and acquired characters; atavism; correlation in the deve opment of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*— The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,— in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,— variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,— observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blow-pipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.— Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.— One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,— is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY— Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.— The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*— The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,— roots, stems, prefixes and suffixes,— associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.— A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.— The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.— The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.— To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,— marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.— The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.— Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.— The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,— attention being paid to spelling and to short and precise expressions in messages,— abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.— Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, JUNE 4, 1881. No. 42.

KANSAS STATE AGRICULTURAL COLLEGE.

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THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

Kentucky Blue-grass.

This is one of the most widely diffused grasses in the world. We have had the amplest opportunities for observing it, even in the best blue-grass regions of Kentucky; and yet we can come to no definite or fixed opinion or agreement upon its merits. But some things are admitted on all hands.

First: That it enters into the composition of the very best meadows and pastures in Europe and America.

Second: That the famous pastures of Kentucky, which will fatten animals faster than any other in the known world, are filled with this grass.

Third: That the fine meadows and pastures of Vermont, and the western slope of the Green Mountains, contain a very large proportion (at least two-thirds) of this grass.

Fourth: That, wherever the sweetest and best-keeping butter is prepared, this grass will occupy a very conspicuous place in pastures; and the best butter cannot be made where it is wholly missing from the pasture.

Fifth: That, although some grasses start earlier in the spring, yet it affords a good bite much earlier than most species.

Sixth: That there is no grass known that bears the extremes of cold as well as this, even as far north as Vermont; for, after being exposed to the cold all winter, it is eaten greedily by cattle in the spring, and they are found to thrive upon it. Sheep and horses will paw away the snow in winter and eat the grass beneath with great avidity.

Seventh: That it only sends up one flowering culm in a season, and these stand far apart; hence, at the first cutting, the burthen of hay is less than that afforded by other species: but in August there is a great growth of root leaves, which gives a heavy bulk at the second cutting; and the rowen, which is more abundant than that of any other grass, fully makes up for the difference of the first crop.

Eighth: That it succeeds in light land, where fibrous-rooted grasses would fail.

Ninth: That its nutritive properties, as given by Mr. Way, are as follows: In one hundred pounds of grass there are 67.14 pounds of water, 3.41 pounds of albuminous or flesh-forming principle, .86 pounds of fatty matter, 14.49 pounds of woody fiber, and 1.95 pounds of mineral matter or ash.

Tenth: That, according to the analysis of Scheren & Rithausen, *Poa pratensis* gave, for one hundred pounds of grass, sixty-two pounds of water, four pounds of albuminous matter, 1.1 pounds of fatty matter, 15.4 pounds of heat-producing principle, 15.6 pounds of woody fiber, and 1.8 pounds of ash.

Eleventh: The Woburn experiments show the production per acre to be 10,209 pounds, which lost 7,337 pounds in drying, and gave 1999 pounds of nutritive matter.

The differences in these estimates of the nutritive value of this grass are undoubtedly due, in a great measure, to differences of soil and climate at the places of growth. We have no record of its producing more than three tons of hay to the acre, and have actually never seen more than one and a half tons of cured hay to the acre. It is well adapted for irrigation. When irrigated lands are ridged, this grass occupies the crown of the ridges. Its favorite habitat is a limestone soil, which, if not too dry, will produce it in abundance. It is seen in pastures three thousand feet above the level of the sea; but its valuable qualities are not manifested at more than half that altitude. —*Prairie Farmer.*

Scientific Farming Practical.

Mr. Buckmaster, before a well-attended meeting of farmers, held at Tadley, in England, to consider a scheme for teaching the science of farming, said that there was no opinion more deeply ingrained in the mind of the English farmer, than the belief that there was some antagonism between science and practice. Some even went so far as to say that the two are incompatible. The farmer who drains his land, or tries a new manure, or a new machine, or a new crop, calls himself a practical man: he despises all experiment, and laughs at the teaching of scientific men. He is not conscious that, when he is thinking over new plans and adopting new methods of cultivation, he may be illustrating, in his daily work, a series of chemical and physiological experiments of extreme complexity and importance. Men of the highest order of intellect, and whose researches were the most original, have been practical men. Practice and theory are but phases of the same form of thought. The practical farmer, if he ever permits his mind to rise above the traditions and empirical rules of his forefathers, and asks, "Could not that have been done in a better and more perfect way? would not this be an improvement?" becomes a theorist; and, when he tries to realize these conceptions, becomes a practical man.

Theory and practice are inseparable in every art, however much men may seek to disunite them. The most practical man is often the most theoretical. Every operation is, with him, a theory. He recognizes no change. He will admit of no trial or experiment, because that would be an acknowledgment of science. Every science is built up of principles, and these principles carried into work we call practice. There is the science of astronomy, and the art of navigation; the science of geometry, and the art of land measuring; the science of mechanics, and the art of making machinery; the science of chemistry, and the art of agriculture. Almost every science is the basis of a cognate art. The most obvious and natural way of arriving at a real knowledge of the art of agriculture, would be to know something of those principles on which the art is based; art being nothing more than the application of principles previously acquired. A farmer who is able to unite a perfect mastery of principles with a knowledge of practical details, is an educated and scientific farmer. It might reasonably be inferred that the shortest and easiest method of learning any industrial art, and the surest guide to new discoveries in the art, would be a knowledge of those fundamental principles upon which the art was based. No amount of practical skill and experience could ever replace the want of scientific knowledge in farming.—*Cincinnati Grange Bulletin.*

Flocking to the Cities.

The tendency of population to towns and cities has been made the subject of much study and comment of late years. It has been often depreciated as inimical to the general welfare of society. Fruit-growing and gardening is to be commended because of its independence, its healthfulness and its almost invariable remunerativeness.

Very few farmers ever "fail in business;" while, in mercantile pursuits, ninety-five out of every hundred fail. Despite these startling figures, there is a tendency that verges upon a mania, to seek business and social life in cities and villages. There are many legitimate and natural reasons for this. Not all men are adapted to farming and kindred vocations. Men who have a natural genius for mechanism, will succeed better as artisans than agriculturists. Men with the appetite for merchandise, will not hardly be content with the culture of the soil. And so with all callings and professions: men should follow the line of business for which they are naturally qualified.

Social, educational, religious, and esthetic reasons also obtain. The advantages of the city, in all these requisitions, are apparent, and not to be denied. It is true that, in their enjoyment, we lose many advantages that pertain to rural life; but, with a large number of people, the attractions of city life outweigh all country attractions. It is well that it should be so. The country without villages and cities, would be a very desirable one to emigrate from; and the city, without its rural surroundings, would indeed be very helpless, as well as undesirable place of abode,—in fact, an impossibility. It is obviously in the economy of nature that these two conditions of society should always exist.—*Howard Courant.*

Our Exchanges.

"! !" is the title of a novel by Rev. Geo. H. Hepworth, which the Harpers have in press.—*Leavenworth Times.*

The farmers are more cautious in investing in farm machinery now than they were several years ago.—*Belle Plain News.*

If the wheat in Cowley county keeps on growing at its present rate, harvesters and headers will have to go in the fields on stilts.—*Telegram.*

The great cornfields of this county are this year, as usual, found in the townships bordering the Arkansas and Nennescah rivers. These bottom lands, in some places miles in width, are as fertile as the famed region of the Nile.—*Sumner County Press.*

Mr. J. J. Pack, about one month since, brought in 1,450 sheep; and they are being kept on the range southwest of town. They are a superior lot of Missouri and Kansas grades, and make a valuable addition to this growing industry in our county.—*Burlington Patriot.*

The Connecticut legislature has passed an act, in amendment to the game law, authorizing the owner of the land to arrest any person found trespassing on his land with bird dog or gun, and take him before a justice of the peace for trial, if he refuses to leave immediately when ordered.—*Mayo Bulletin.*

The growing tendency in this country toward more live stock, more beef, more hogs, more butter, wool, cheese, etc., should be encouraged. Every farmer should begin now to prepare his pasture, and be ready to seed it down in blue-grass and clover. Put in such crops as the cattle, horses, sheep, and swine can harvest of their own accord.—*Smith County Pioneer.*

A plan is on foot to build a free church building in this city, to be used by any denomination or society that is intended to promote the moral, religious, or scientific views of the community. The church is to be under the charge of a board of directors elected by the subscribers to the fund. Over four hundred dollars have already been raised; and we hope the plan will meet with success.—*Burr Oak Reveille.*

A census bulletin shows that Kansas has 19 daily papers,—6 morning and 13 evening. There are 17 weeklies connected with these dailies, and 2 Sunday papers. The average subscription for dailies is $7.10; average daily circulation, 1,280; aggregate daily circulation, 23,051; average circulation of the weeklies connected with the dailies, 2,750; aggregate, 41,264. During the year ending June 30, 1880, there were 7,059,412 dailies circulated, and 2,179,508 weeklies.

THE INDUSTRIALIST.

SATURDAY, JUNE 4, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

Weather Report for May, 1881.

Mean temperature of the month, 68°.2, which is 2°.24 above the mean for May. Mean at 7 A. M., 64°.6; at 2 P. M., 74°.8; at 9 P. M. 66°.8. Highest temperature during the month, 85°, on the sixteenth. Lowest, 48°, on the second. There was rain on fourteen days; viz., 4th, 5th, 7th, 9th, 12th, 13th, 14th, 16th, 18th, 19th, 20th, 28th, 29th, and 30th. The total precipitation during the month was 6.67 inches. This is 2.46 inches above the average for the month of May. On the 5th, there was a light hail-storm, accompanied with rain. On the 15th, 1.45 inches of rain fell in one hour. On twelve days the cloudiness averaged 80 per cent or more; on twelve days averaged 40 to 80; on seven days, less than 40 per cent.

Mean barometer, 28.59: mean at 7 A. M., 28.59; mean at 2 P. M., 28.58; mean at 9 P. M., 28.59.

The wind blew from the north at 7 observations; from northeast at 17; east, 16; southeast, 23; south, 11; southwest, 15; west, 1; northwest, 3.

Alabastine.

The public has frequently been warned of late from the use of poisonous paints and wall-papers in dwellings; and it is a fact well known to-day that, even if these covering substances contain no arsenic or lead as coloring matter, they stop "wall respiration," — the free passage of air through the pores of the walls. It is known that, through every yard of common stone or brick wall, at a difference of 20° F. in temperature between outdoor and indoor air, eight cubic feet of air pass every hour, thus cleansing the wall.

By using common whitewash or kalsomine, the air circulation is not stopped to a great degree; but both of these extensively used substances are objectionable for other reasons. Whitewash soon turns yellow, rubs off, or peels; and all kalsomines depending upon glue to hold them to the wall, either scale off or decay and become soft. Before the wall can be properly coated over again with these substances, it is necessary to scrape or wash off the old materials,— a disagreeable and expensive procedure.

Practical chemistry has produced many mixtures for substitutes, but none could gain the favor of the public. The substance named at the head of this article, an alabaster cement, will, however, if we are not greatly mistaken, require but a short time to become a household article. We have kalsomined many thousand yards of wall surface, and give alabastine the preference in every particular. It is cheaper than glue and ground chalk, does not scale from a hard surface but becomes harder with age, covers well, can be had white or in colors, and is ready for application to walls with the brush by simply adding hot water. Prof. Kedzie, President and Chemist of the Michigan Board of Health, gives it his recommendation in regard to sanitary influences in dwelling houses.—*Prof. Walters.*

Listing Corn Again.

A number of farmers have written us for the method of corn culture by listing, the advantages of which were referred to in an article in our issue of May 14th.

The listing plow referred to in that article is simply a plow having a double mouldboard which throws the earth equally to the right and left. This plow is used upon the land without plowing or other preparatory tillage. The lister is worked by three horses, and the furrows are struck where the rows of corn are to be. After the listing has done its work, the surface of the field is made up of a succession of ridges and furrows, but presenting, unless the rows are very wide, an exposure of fresh earth in all the parts. In the furrows made by the lister, corn is drilled by any one of the numerous one-horse corn drills, which put in the seed at intervals of ten to sixteen inches, as may be desired.

A modification of the lister is sometimes seen consisting of the ordinary listing plow, having a drill attachment which drills in the corn as fast as the furrow is opened. The advantages of this method over the old method of corn culture will be appreciated, when it is understood that one man puts in with the lister from six to ten acres per day.

After the corn is planted, the harrow is kept at work over the field until the corn is eight to ten inches high, when the cultivator finishes the work. The harrow acts very efficiently upon the ridge between the rows of corn, leveling the ground and working in the fine earth about the corn.

The advantages claimed for this method of corn culture are, (1) that the crop may be made at a cost one-fourth to one-third less than by the old method, (2) that the yield per acre is greatly increased, and (3) that listed corn endures dry weather better than that planted by the old method.—*Prof. Shelton.*

Laboratory Notes.

We have not made a practice of noticing, in these columns, the analysis of minerals, water, etc., made in the Chemical Laboratory. The following are those for the past week: —

Water.—Two samples of suspected well water. In each case, the amount sent me was too limited to permit a full quantitative estimate of the impurities. So, after a qualitative estimation, the remainder was submitted to distillation after Wanklyn's method, for the purpose of determining the organic matter present. Aside from mineral poisons, such as lead and arsenic, the organic impurities are by far the most important considerations. No. 1 gave .027 parts of free ammonia in one million, and .08 parts of albuminoid ammonia. The qualitative analysis indicated the presence of chlorine in not very great amount, but the quantity was not determined. No. 2 gave free ammonia, barely a trace; albuminoid ammonia, .20 parts in one million. There was in this nearly the same quantity of chlorine.

In interpreting these figures, it must be borne in mind that the content of ammonia is significant only as it implies the destruction of organic compounds which were in the water or in the source from which it comes. Regarding albuminoid ammonia, Wanklyn makes three divisons: water yielding .05 or less parts per million may be considered to be organically pure; .05 to .10, of medium purity; above .10 parts per million should condemn the water.

Persons sending or bringing water for analysis should bring not less than a quart, and a half a gallon would be better. Above all things, make the containing vessel absolutely clean, and rinse several times with the water which it is to contain.

From Mr. Boicourt, Moline, Kansas, were received small specimens of galena. It was in the form of an incrustation on the sides of a vertical fracture or crevice in a fossil-bearing limestone. Galena is found in limited quantities quite widely distributed through the State; but the only paying mines so far known are in the extreme southeastern portion. This is where the sub-carboniferous rocks extend from Missouri into our State. There is the greatest difference in the obvious characters of the rocks and soil of this limited section, and those of the level prairies but a league beyond. The geological characters are such that I feel certain as to the results of efforts to find valuable ores in paying quantities elsewhere in the State.

From Hon. John E. Rastall, of the *Chronicle*, Burlingame, a very peculiar specimen of coal was received. The specific gravity was very low,—1.13. It is compact and lustrous, does not leave the least trace when rubbed on white paper, cokes well, and affords a large amount of gas. The ash is very small, being 1.98 per cent. Few particulars regarding the vein were received. It is only known that there is an irregular vein from two to six inches thick, occurring below the coal proper. It was obtained at the Black Diamond shaft at Burlingame.—*Prof. Failyer.*

The Bismarck Jubilee.

When Kansas tries, she beats all the world. Some years ago, while she was yet a very young State, she took some of her fruit to the National Pomological Exhibition, and carried away the first premium with great honor. In 1876, Kansas put her best foot foremost at the grand Centennial Exhibition, at Philadelphia; and it was acknowledged, by all hands, that she really made the finest exhibit there was on the ground. Last year she made a great temperance rally, and became the banner State of the Union by incorporating in her State constitution a plank prohibiting the manufacture and sale of intoxicating drinks as a beverage. This year she is to have the grandest musical jubilee the world has ever seen since the days of Solomon.

Prof. C. E. Leslie, of Chicago, has undertaken to collect a larger number of singers at Bismarck, next August, than was ever convened on this continent, and probably larger than ever assembled in Europe. He is confident there will not be less than three thousand, and probably as many as four thousand, voices. At the great Boston jubilee, a few years since, the effort was made to collect two thousand voices; but not more than fifteen hundred assembled. Prof. Leslie is now visiting all the towns in the State, of over one thousand inhabitants. He has twenty-eight assistants; and they hold a convention of five days in each town, and organize a class for the jubilee. They meet the class once in two weeks after the convention, until the jubilee, for the purpose of drill. None of his classes number less than one hundred, and some of them reach two hundred and fifty. The class just organized in Manhattan now numbers two hundred and twenty. Not all of these, but a large majority of them, will attend the jubilee and sing in the choruses. Besides the choruses, some of the finest musical talent in the United States has been secured as soloists for the occasion. Six quartets from Chicago will be in attendance, also several brass bands. Take it altogether, the entertainment at Bismarck on the 18th, 19th, and 20th of August, will be really huge; and it will, undoubtedly, attract a large attendance of visitors.

Such a musical wave as is now passing over our State, never before reached us; and it is to be hoped that such an interest in music will be created, that its influence will be felt for generations to come.

Prof. Leslie is the most enthusiastic man, musically, that ever came to Kansas. His helpers partake largely of his disposition in this respect; and the effect of their conventions, in connection with the jubilee, must be to create a new interest in the subject of music. This is as it should be. Music is one of the fine arts, which should receive far more attention and encouragement than it has in the past. There is not a religious meeting of any description at which the emotions are not animated, the moral faculties stirred, and noble thoughts and purposes inspired, by strains of good music. There is not a secular or social gathering that is not enlivened and made more enjoyable by appropriate song or performance upon instruments. Every family is made more cheerful, every home made brighter, and every heart happier, by the cultivation of music. Therefore, let us encourage the art. Let all the people learn to sing, and be benefited by it. There are very few persons who have not some good degree of musical talent, if it were developed. The trouble is, so many persons neglect to cultivate their talent in this direction, until they think they have none. Of course, youth is the most favorable time for the cultivation. Let music be taught in all our schools; and, where this is not practical, let singing classes be encouraged, so that a knowledge of the science as well as the art may be placed within the reach of all.—*Prof. Platt.*

Educational Gossip.

The girls to the front! The graduating class in the Wichita high school, this year, consisted of nine members: seven were girls. In Winfield, the class consisted of five, four of whom were girls.

Noble L. Prentis has finished his southern trip and letters, and has arranged with Geo. W. Martin, the State printer, to issue an edition of 1,200 copies in book form, which will be sold at 50 cents a copy. These letters are full of interest. Get a copy.

The Commencement exercises of the State Normal School, at Emporia, will be held June 12–16. The annual address will be delivered by Hon. T. Dwight Thacher. Subject: "Public education in Kansas; what the State assumes to do, what it does, and what it ought to do."

Even the school-teaching profession is not free from snobs. 'Tis said some of the Topeka teachers talk of resigning, alleging that they will not work under a plow-boy, as they style Prof. D. C. Tillotson, the city superintendent, because forsooth he at one time was a farmer boy. If being a plow-boy disqualifies Prof. T. for the office of superintendent, what have they to say of Grant, the tanner; Lincoln, the rail splitter; Garfield, the tow-boy; Colfax, the printer's devil; or W. B. Strong, general manager of the Santa Fe Railroad, the brakesman.

The following ruling by the State Superintendent, H. C. Speer, is in answer to the principal objection raised in "An Unjust Law," published a few weeks ago. No certificate of the third grade can be issued a second time to the same person in a given county; but there is nothing in the law which can be construed to restrict a person from obtaining one third-grade certificate in each county in the State. I have advised with the Attorney General on this matter, and his judgment sustains the view of this office. Any teacher may receive one third-grade certificate after March 9th, 1881; but a second one would be void and of no force. In the case of applicants who have never taught, I recommend you to issue *Statements of Standing*, certifying that the holders are entitled to have a third-grade certificate issued to them on call. Such papers will satisfy school boards that the parties are legally qualified teachers; and, on the other hand, such teachers, in failing to make engagements, are not barred from making another trial in the county. In this connection, I will advise you to *recall and cancel* all the third-grade certificates issued under the existing law to persons that have not had an experience of three months, and to substitute statements of standing, as suggested herein. The object of the law is to compel improvement among teachers; and the only hardship that could arise by its operation, is the one discussed, and for which a simple remedy is suggested.

THE INDUSTRIALIST.

SATURDAY, JUNE 4, 1881.

The rainfall of the week has been 1.27 inches.

The College catalogue for 1880–81, is now ready for distribution.

Mr. Steinberger, of the Howard *Courant*, made us a very pleasant call last week.

The regular meeting of the Board of Regents will be held on Tuesday, June 7th, at 9 A. M.

The Howard *Courant*, a large and excellently edited paper, we with pleasure place on our exchange list this week.

President and Mrs. Fairchild entertained the Senior Class and friends, on Tuesday evening. A delightful time is reported.

One of the very pleasant events of the week, was the presentation of a handsome upholstered chair to Prof. Platt, by the members of the singing class.

Those rollicking Seniors, with their respective affinities, were out again on Wednesday eve, this time at Prof. Failyer's. The Professor and Mrs. Failyer are reported to have made it very pleasant for the "grave and potent" class of '81.

A recent visit to the farm of Hon. Welcome Wells, located three miles east of Manhattan, revealed the important fact that his famous forty-acre orchard is loaded with fruit. The apple and pear trees, in particular, fairly bend under the weight of young fruit.

At the request of the Faculty, Mr. Houghton will run a hack between the city and the College on Monday, Tuesday and Wednesday of next week. Commencing at 8 o'clock, the hack will start from Purcell's corner, at intervals of one hour each, during the day. Fare, 10 cents each way, or 15 cents round trip.

The Burlington *Patriot* lifts its hat, "figgeratively" speaking, and announces that next week completes the 12th year since the 1st number of the *Patriot* was issued by the present editor, Bro. Brown. It further remarks that it's healthy and happy, and next week will come out with stylish duds, cylinder presses, etc. The *Patriot* is worthy of this good fortune.

A sealed case, containing college catalogues from 1874, the hand-book, college reports, commencement addresses, bound volumes of the INDUSTRIALIST, Riley county sketch-book, and other documents, has been placed in the large space beneath the vault of the new building, where, incased in solid masonry, it will remain until resurrected by some curious antiquary, a thousand years hence.

Mrs. Cripps and the class in Household Economy have won the thanks and cash of a large number of students, by providing, yesterday, another of those popular 15-cent dinners. There is only one drawback to this dinner business, and that is the rigid application of the inflexible, inexorable 15-cent rule to "pears." 15x2=30 is a very simple arithmetical problem; but we strongly suspect that its application to these dinners, is rending "attachments" and pocket-books in a way not contemplated by our arithmetic-makers.

An interesting fact in connection with our old friends, the Rocky Mountain locusts, was brought to light here during the week. While cleaning away an accumulation of "spalls," mortar and clay in the rear of the Laboratory, the workmen discovered, in the unbroken ground beneath, a considerable number of nests of grasshoppers' eggs, at the depth of six or eight inches. The rubbish above referred to was placed in position in the fall of 1876, shortly after the deposit of the eggs the same fall. These eggs, appearing fresh and healthy when taken from the ground, were placed, by Sup't Graham, under favorable conditions for hatching; and, in due time, a swarm of lively juvenile *Caloptenus spretuses* came from these four-and-a-half-year-old eggs.

COMMENCEMENT.

The exercises of the Twelfth Annual Commencement of the Kansas State Agricultural College, will be conducted according to the programme given below.

The baccalaureate sermon will be preached by President Fairchild, on Sunday evening, June 5th, in the Presbyterian Church. Services to commence at eight o'clock.

On Monday and Tuesday, June 6th and 7th, the term examinations will be held in the recitation rooms at the College. These examinations are public, and partly oral and partly written.

MONDAY.

8:50 to 10:30.—Algebra, *Ward;* Anatomy, *Shelton;* Agricultural Chemistry, *Failyer;* English, *Platt;* Printing, *Stewart;* Carpentry, *Hawkes;* Sewing, *Cripps;* Music, *Hofer.*

10:35 to 12:10.—Political Economy, *Fairchild;* Geometry, *Ward;* Analytical Chemistry, *Failyer;* Book-keeping, *Platt;* Drawing, *Walters;* Telegraphy, *Graham;* Printing, *Stewart;* Carpentry, *Hawkes;* Sewing, *Cripps;* Music, *Hofer.*

TUESDAY.

8:50 to 10:30.—U. S. Constitution, *Fairchild;* Composition and English, *Ward;* Analytical Chemistry, *Failyer;* English, *Platt;* Drawing, *Walters;* Carpentry, *Hawkes;* Sewing, *Cripps;* Music, *Hofer.*

10:35 to 12:10.—Surveying, *Ward;* General History, *Shelton;* Botany, *Popenoe;* Drawing, *Walters;* Telegraphy, *Graham;* Printing, *Stewart;* Carpentry, *Hawkes;* Sewing, *Cripps;* Music, *Hofer.*

2:00 to 3:40.—Botany, *Popenoe;* United States History, *Platt;* Household Economy, *Cripps;* Drawing, *Walters;* Telegraphy, *Graham;* Printing, *Stewart;* Carpentry, *Hawkes.*

On Monday evening, the classes in vocal and instrumental music will give an entertainment in the College Chapel, to be followed by a social.

On Tuesday evening, the annual address will be delivered by Hon. S. S. Benedict, Senator from his district, in the Presbyterian Church.

WEDNESDAY.

The Commencement exercises will be held in the Presbyterian Church on Wednesday morning, beginning promptly at ten o'clock. The order of exercises will be as follows:—

MUSIC,—From "Bohemian Girl." Orchestra.

PRAYER.

MUSIC,—"Greeting to Spring." Quartet of ladies.

Unfinished Work, DALINDA MASON, Delphos.

Every Man in his Place, FLORA DONALDSON, Chelsea.

Look on the Bright Side, WIRT S. MYERS, Iola.

MUSIC,—From "Trovatore." Tenor solo.

Men of Character, U. GRANT HOUSTON, Manhattan.

The Dawn of Science, WILLIAM J. JEFFERY, Zeandale.

The Two Records of Creation, FLETCHER M. JEFFERY, Zeandale.

MUSIC,—"Fly away, Birdling." Duet of ladies.

Our Country's Claims, WILLIAM J. LIGHTFOOT, Jewell City.

Study of Nature the Basis of Progress, DARWIN S. LEACH, Beloit.

CONFERRING OF DEGREES.

MUSIC,—Gloria of Mozart. Orchestra.

BENEDICTION.

Address before the Society of Alumni, by W. D. Gilbert, of Atchison, class of '74, in the Presbyterian Church, at 3 P. M. Reunion of the Alumni at the College, in the evening. Business meeting, at 7 P. M.

Twelfth Annual Commencement of the Kansas State Agricultural College, at Manhattan, June 6th to 7th. The institution is reported in excellent condition, and doing good work for industrial education in our growing State.—*Abilene Gazette.*

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education—using the term in its popular sense—can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument, $1.00
Private lessons, 1 a week, on any instrument, .60
Class lessons, 2 a week, on any instrument, .65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. F. M. JEFFERY, President.
MISS GRACIA POPE, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
S. C. MASON, President.
R. A. HOLLENBERG, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery,

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil, climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the deve opment of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blow-pipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

F. G. Adams

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, JUNE 11, 1881. No. 43.

KANSAS STATE AGRICULTURAL COLLEGE.

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DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

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QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

[Published at request of the graduating class.]

Baccalaureate Sermon, June 5th, 1881.

BY PRESIDENT GEO. T. FAIRCHILD.

"Whosoever will be chief among you, let him be your servant."—*Matt. xx. 27.*

The future gathers strength and courage from the past: its successes and failures have their germs in the suggestions of experience by which the plans of life are laid. For this reason our anniversaries, the milestones of life's journey,—birthdays of individual life; wedding festivals, tin, silver and golden, in family life; independence and decoration days in national life—all have their highest significance. With rejoicing over past achievements, comes enthusiasm for those before us; and life is wiser, happier, longer, for these days of halting in review.

Such a day in college life is commencement—the day that marks progress of individuals, of classes, of the college, and of the people; for we all move on together. To the graduate, it is the goal of one course, but starting point of a grander one: to us who look on, it has the double interest of sympathetic joy with those who have already won, and of earnest expectation for those who are finally to win. To the earnestness of this last feeling, we owe that honored custom, to which we conform to-night, of offering one last plea for those elements of moral character out of which an honorable and an honored life may grow.

So, my dear friends, pupils for this last time, let the same familiar tones which you have heeded so kindly in the race just finished, echo and re-echo as you run the race before, to cheer you toward a better goal in that grand struggle for the mastery called life. The grandeur of this struggle—the whirl and whirr of competition that crazes and crushes so many who seem well started—has lead to the choice of my theme, "The True Ambition." The expression which seems best to embody my thought, was among the last words of the great Teacher to his pupils, thenceforth called friends,—"Whosoever will be chief among you, let him be your servant."—Matt. xx. 27.

To be chief somewhere seems the one common aim of humanity: the mass of us see no other end of living. The fact of competition throughout the universe is so readily perceived, and so evidently a part of the external world, that we sometimes shirk responsibility for oppression and violence, under the euphemistic phrase, "struggling for existence." We believe that the law of nature everywhere is rivalry, and question almost as little the means by which one man overtops another as we do the power by which one tree in the forest crowds and smothers its neighbor, or one beast crunches and devours its fellow. The whole external creation, we can see, thrives under this dispensation of rivalry. A thousand winged seeds drop upon the breeze that brings some to the honor of safe planting, and others to the dishonor of withering decay. The few that germinate, thrive upon the nutriment stored in the wasted ones. Among these, favoring sunlight, showers and soil make early distinctions to develop by varied circumstances of growth, until one has absorbed the strength of all the rest, and become a tree, beneath which scarcely even ordinary verdure flourishes. To be sure, we sometimes perceive loss. A single seed finds lodgement in the mellow soil of your meadow: it thrives, and its progeny fill the meadow,—the grass is conquered by weeds. But, on the whole, there is progress.

The same contest rages in the animal world. Its range is infinite, almost,—individual yielding to individual, species to species, race to race, as rival powers promote one to supremacy and doom another to destruction. The whole realm of life, vegetable and animal, seems one huge battlefield, where contests between great and little, little and great, never end. The great rises, the little falls; the little, massed in numbers, worry the great to death and feed on his body. Appetite and venom range throughout the infinite universe of immensity and littleness, so that, accustomed to this all-devouring rapacity, we can laugh with Dean Swift over the fact,

> "The naturalists observe a flea
> Has smaller fleas that on him prey;
> And these have smaller still to bite 'em,
> And so proceed *ad infinitum*."

The universe reiterates the lesson in all directions; nor does it stop when man becomes the object of study. Human nature has, from the dawn of history, shown the domineering spirit that brooks no rival near, "in wealth, or strength, or rule." "War its thousands slays, peace its ten thousands," says the poet; and all for rivalry. So constant has destruction attended the world's progress, that we have almost taken for a proverb the saying of Gibbon, that "History is little more than the record of the crimes, follies, and misfortunes of mankind."

Is it strange that Paul cries out, "The whole creation groaneth and travaileth in pain together"? Looking only at the pain, we might imitate the folly of Job's wife in advising that we all "Curse God and die." But, when we look at the glorious unfolding of life, strength, intelligence, and moral freedom, brought into the world through this pain, we can trust to "Him in whose hand our breath is, and whose are all our ways." We can learn that this law of rivalry, like all of nature's methods, is a part of that great plan of progress toward a perfection of which we only guess from experience; at which the fullest inspiration only hints; which "eye hath not seen, nor ear heard, neither have entered into the heart of man to conceive." Yet in the natural and in the moral world we do see results enough to warrant faith in progress through suffering, and to accept the struggles of the race with one another as evils out of which good has come. The ancient ravages of conquest, even, have been God's means of teaching the way to freedom and self-control for later ages.

We feel, too, the aspirations which may help our conjectures. Our beau ideals, our noble aims, our prizes in life, have their peculiar power over us because of something before toward which we would make progress. "*Ad astra per aspera*," becomes our State motto through the same lesson of experience. It must be, then, we say to ourselves, that such a law of supremacy pervades the universe for the grand object of the whole, whatever that may be; and do not you and I but follow this law of nature, when we ride rough-shod over neighbors and friends toward the goal of our ambition? Surely we, like the rest of creation, may follow this great law of progress.

But let us see, are we not looking backward only when we thus excuse our selfish lust for power? The true law looks forward. "Survival of the fittest," men of science call the result in the great physical struggle of the universe.—Fittest for what? Fittest for surviving? That can be but a truism: "It survives because it is fit to survive. It is fit to survive because it survives." Either would serve as proof for the other in a circle too small for even scientific speculation to turn upon. It must be fittest for the ever-changing world in which it moves; fittest to live, because it best conforms to the plan of life pervading all creation. So, while the competition never ceases, he is competing in the line of progress who seeks to know the plan of his Creator in his being, and to find his aspirations clinging to the future greatness and goodness of the world, rather than to past methods or to the present good of self. His earnestness, zeal, and energy all may spur to rivalry in that which belongs to the good of his fellow-men, for whom this law of progress acts. In this way, there is room for such a struggle for the mastery as may well try the powers of a Hercules, while a generous nature, not an envious one, develops into greatness in which all rejoice together. Such, in our better, Christian civilization, must be the strife of one who would be chief.

Yet this is no new doctrine: it is taught in the first spur of conscience; the race has felt it through these thousands of years, whenever the bias of brute passion could be thrown off by judgment, and men could see themselves in the light of their neighbors' actions. We need not even go to the Bible to find exhortations toward energy in doing good: the works of all the sages abound in them. I cull a few of them from well-known teachers outside the influence of Bible truth, though acting under the same great law written upon the heart. Chion, "Please everybody: hate violence." Thales, "Desire honor and glory for virtue: deserve well of everybody." Periander, "Be serviceable to to everybody." Socrates, "Sow good works, and thou shalt reap joy and gladness." Plato, "Thou shalt be loved of God, if thou do good to all men and hurt nobody." "He that will have glory in this life, and after death be beloved of many and feared of all, let him be virtuous in doing good works." Marcus Aurelius, "Endeavor to do so well that others may envy thee therefor." So all the moral codes of all the ages reflect the common conscience of mankind; and praise with words that noble ambition which serves. He who strives and struggles for greatness without this guide from the inner sense, must err against all wisdom, must follow the blind impulse of passion unchecked by reason. But he who, forever unsatisfied with his achievements, uses this natural longing for better accomplishment, as a means of lifting the world's burdens, lightening its pains, and enlarging its joys, is following reason, and lives well.

And yet we find ourselves at every turn of life misled by vain ambitions after greatness. The fancy of childhood bedecks us with the plumes and buttons of a captain; the air-castles of youth promise our wealth and culture; the wavering caution and speculation of middle life expresses faith in a destiny; and even the misanthropy of age asserts the same greed of power. Almost none of us are free from the temptation to mistake notoriety for note. Yet to be notorious is easy: we have only to descend a little below our neighbors towards brutishness. To be noted in the after ages that try men's motives, we must move before the rest of our day in some great line of advantage to the race. The notorious man becomes only execrable: the man of note grows dearer to the race as the world moves on.

A still stronger temptation to the best of us is the feeling that unappreciated merit is lost; that the winning of a race with no cheer from the crowd of lookers-on, is a waste of exertion. If there were no prize but renown, 'twould be true; and we might rightly do good, as we try to sometimes, only where the good will show. It is possible to "sound the loud timbrel" of missionary effort for Ethopia, and "pass by on the other side" the pressing claims of a friendless neighbor, or even of our own dependent

babes. The true ambition looks to results in reality, not to their shadow, which falls subject to changes of sunlight and shade. It finds its end in the deed, not in the renown. If we believe with Longfellow,—

> Lives of great men all remind us,
> We can make our lives sublime,"

we need not believe, or hope, that the world will recognize their sublimity; and yet may strive with the same energy, and win as true a prize of happiness. The "mute inglorious Miltons" rest just as peacefully as does he whose name is echoed through the world; and their struggle for good may have been quite as satisfying as his, while it lasted. Real sublimity of life is not made greater or better by the clapping of hands or the shouting of "bravos," any more than Mt. Blanc is raised by the tourists who write about it, or than the whirlwind is quickened by the clatter of the flying crowd. Indeed, it too often happens that show diminishes the real exertion, and oftener still diminishes results. We learn in college that too ardent a polish for recitation, soon dwindles into a shabby gentility of words without thoughts. So in the school of life, the one who is enticed to his tasks by promised show will soon care little for the deed. Unsatisfied with their flimsiness, he often loses the desire to gain even the praises. But, if not less ambitious through testing the vanity of show, one is likely, if this motive leads him never so little, to have his power curtailed. The light of a "good deed in a naughty world" that, like the candle, shines so far to check the bad and cheer the penitent, is blown out by the least breath of suspicion that show suggested or sustains it. The thought of show weakens every virtue, from generous benevolence down to selfish frugality. And yet so prone are men to follow show for substance, that our Savior's advice, "Let not thy left hand know what thy right hand doeth," is none too strong a safeguard against the vain ambition to seem great or good.

These temptations find most power with the less earnest part of would-be well-doers. There is a stronger temptation to many real thinkers, through the common admiration of human energy. Tenacity of purpose, steadfast endurance, firmness before obstacles, call forth praises everywhere. The very death-grip of a brute we view with respect. So a large class of real thinkers make an idol out of force of character. This worship attracts especially the budding manhood of intelligence. Seeing that many fail of gaining their good ends, for lack of force, we may exalt force above the ends it gains. At the best, it is only a means, and gives no good to its possessor or to the world, except it be well aimed. As well take the powder for the game, as suppose that tenacity of purpose is good alone. Tenacity for the sake of the real good that grows upon our vision as we approach it, is the godlike firmness that "sweareth to its own hurt and changeth not:" tenacity for its own sake is at best but stubbornness, mere mulishness. Yet force of character carefully aimed is not always worthy. Force is not virtue, though one of its elements. Force may win both fame and name, to deserve only execration. Force may purchase its ends by deeds of usefulness, and still be devoured by envy of others who climbed up an easier way. Force may go down to the grave with nothing of peace or rest in view — uneasy at the thought of death — never "ready to depart." Even its work, when left behind, is likely to have been all a mistake, because the heart was not in its progress, but in self. Force wins but the gross and showy favors: virtue wins the grand and lasting. There is no place for force alone, in our civilization of the future. Force in nature has served its purpose only when controlled by wisdom; and in character, it must be tempered and constrained by virtue. Then only are its fruits worth our craving. In the rough jangle of mere material elements, the strongest always wins; in the forest wilds, it is the most ferocious beast that rules as king; on the unbroken and neglected ground, it is the ugliest weed that usurps the field: but on our tilled acres, it is the plant of richest fruit that stays; in our protected fold, the finest of the flock is cherished; in our enlightened homes, the tenderest chords hold firmest. So in the garden of God's future providence, will thrive only the good: in the mansions of his mercy, are found only the righteous.

So, again, our ambition is vain if it falls short of doing good; while he whose thirty, sixty, or a hundred-fold of service has brought forth fruits accordingly, strives to good purpose and good end. But just here we need a caution too. Our hope of heaven may be a vain one unless cherished rightly. Our "mansion prepared" is not to be purchased by any set of good deeds. Heaven cannot be earned like wages, by the day or by the task. Even he who thinks to lay up his treasures in heaven by doling out his treasures of mammon here in alms, or by heaping up endowments even for the good work of others, serves only as the hireling for whom there is no place among the sons. No service rendered only for the sake of an expected reward can entitle one to the least place among the chosen ones. How much less can it make him chief! The reward of righteous service is great indeed: it deserves to be considered in every estimate of action. He is well called a fool who ignores it; but he is even more a fool who hopes by his cheap offering of heartless goodness to secure it. We call the greed of gain in this life "worldliness:" some one has called such scheming for another life "the other worldliness." It ranks no higher.

The man who in his active service finds no foretaste of the kingdom of heaven within him, has yet found no place in heaven for the least of his treasures, and must receive the doom, "I never knew you." He that puts body and soul into the strife to give most service, is the one who finds his treasures saved, "manifold more in this present time, and, in the world to come, life everlasting."

So it happens that one who humbles himself to serve, becomes the chief in service, the one always needed,—the one always missed in absence, the one always prized in present service, though he be only the servant; while the one whose ambition overreaches this plane of lowly service, is abased by his own uselessness.

Do you say, "The struggle is too hard: it is against nature; manhood has not reached the height of self-denial needed for such accomplishment?" I answer: "Too true;" and yet, "whosoever would be chief" must do it. This race is not to the swift; this battle not to the strong, but to the humble. He strives well who acts with all his might the part which duty gives him, and hopes to find his goal secured in duty done. This rule of duty is no hidden one: our hearts are engraven with it; Jesus, who spoke as never man has spoken, gives it in words, and expounds it in life; then, about to yield his life for humanity, can say with no boasting, "I have conquered the world." His words still call us to the contest, still inspire us to the service, and his example still shows the way of true ambition; his strength is still sufficient to sustain the contrite ones in every contest; for all along the ages past, amid all pride and bigotry and cruel lust of power, there have been those whom the world respects for honest service in his name to the generation in which they lived. In their rivalry, there is no jangling: all distinctions in their name and fame vanish in the light of great accomplishment; for who can compare such sacrifices. The love with which they loved their fellow-men is like the mercy of the Father.

For this rivalry in service, the world is open. Its necessities call loudly to the educated man or woman; and one who can gird himself to bear its burdens, finds room to do his best. If well equipped with self-control and wisdom, he can lead among men, through their need of his service. He need not know of his leadership; he may feel the weakness of his strongest efforts, but the will that puts his least energies into the service of his fellowmen, carries him on before them. What a world of good she does whose gentle ways soften the blows of fortune in the home, and soothe the rising passions of untrained humanity! How often to child, youth, and full-grown man, the mother is chief! Could you supplant her in supremacy by any chieftain made by conquest in the more brutal contests of life? The better service she can render by talents, knowledge and skill, the more her power is felt in every part of life. "The hand that rocks the cradle rules the world," 'tis said. This is true, if loving service to the world inspires the action. The man or woman whose domineering spirit must have rule or ruin, cannot win where real training of character is found; but he whose will is bent on usefulness with no taint of vain ambitions, finds all his training needed, but is sure of all it brings.

To you, my friends, who are about to shift from college rivalry into life's sterner race, I commend this way of making most of it. Life has all the exhilaration of a race to the one who runs in this spirit of usefulness; for, though we often fail to do the good we would, we get the good of trying. More than that, we feel so sure of being in sympathy with the world's onward motion as to find our *mistakes* with gladness, not because we have made them, but because they are found.

I would that you might see in us who have gone a step before you, this humble grandeur of service; and so this lesson of mine might have the tameness of words after deeds. I can only point to him who, lifted upon Calvary, still draws all men unto him. He shows you freedom in a realm of fate, peace amid the battles of elements, rivalry without a pang of jealousy, rule without oppression, and victory with love.

May no vain ambitions mislead and destroy you, while "the light of men" thus points the way of rivalry in service. May the world learn to appreciate your service; but, if it does not, your works will praise you to the everlasting Father.

THE INDUSTRIALIST.

SATURDAY, JUNE 11, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

The next issue of the INDUSTRIALIST, the closing number of Vol. VI., will appear on July 2d, and will contain Senator Benedict's able address, and much valuable information regarding the several departments, and the financial condition of the College. In bringing this volume of the INDUSTRIALIST to a close, and with it the record of a busy year, and the most prosperous one in the history of the College, we cannot forbear expressing our appreciation of the many courtesies received from the press of the State during the year, and during the entire life of this paper. The first issue of Vol. VII. will appear on August 27th; and, while for this volume we have no new features to announce, we can at least promise that the INDUSTRIALIST will in the future prove as useful to the College and the State as in the past.

A more or less complete index to Vol. VI. will be issued with the next number of the INDUSTRIALIST.

Everybody has a good word to say for the singing, and the music generally, of the late Commencement.

The College is under obligations to Senator Plumb for a copy of Powell's Geological Survey of the high Plateaus of Utah. Such *public documents* are accepted with heartiest thanks.

During the week, a large number of small quantities of seed corn have been sold, and two very handsome Berkshire gilts,—one to Col. Miller, of Clay Center, and another to A. Wright, Esq., of Oskaloosa.

One of the pleasantest features of the Alumni banquet, was the speech of our old friend, ex-President Jno. A. Anderson, now M. C. from this District. Mr. Anderson's feeling speech, in which he referred to the work done and the great future before the College, was heartily applauded by all present.

The catalogue for 1880–81, now in course of distribution, is, as far as the printing goes, the product of our Printing Department; and we take occasion to point it out as a very neat job, even if it was done by the students. The catalogue before us is, in point of size, eight pages less than that of 1877–80. It contains the information customary in such publications,—"Objects and Methods," "Course of Study," "Means of Illustration," etc.; and the names of the 267 students (179 gentlemen and 88 ladies) in attendance during the year.

It would seem that the Faculty is to be quite extensively diffused during the next two months. President Fairchild starts this week for New Mexico, to be gone something over a week. In August he starts for the East, with the object of visiting a number of agricultural colleges, including those of Michigan, Ohio, Indiana, and Iowa. Prof. Ward is already on his way to an alumni gathering at his Alma Mater, Hamilton College, of Clinton, N. Y. Prof. Shelton expects to attend a meeting of teachers of agriculture and horticulture, to be held at Lansing, Mich., June 28th. From thence he goes to Canada and New York to visit certain noted herds of Angus cattle. Profs. Failyer and Popenoe will remain in the State, keeping up a sharp lookout for specimens for the museums. Prof. Platt is booked for a good deal of institute work in different places in the State. He also takes an active part in the preparation going on for the great Bismarck jubilee. Prof. Walters talks of using his brush in one of the eastern cities. Mr. Stewart will make a full hand in Geo. Martin's State Printing House. Mr. Graham will remain in the Secretary's office during part of the summer. Of the intentions of Mr. Hawkes, Mrs. Cripps and Prof. Hofer regarding the disposition of vacation, we are not advised.

Among the very pleasant features in connection with Commencement week, was the presence of a large number of old students and Alumni of the College. We give below a more or less complete list of the Alumni present on this occasion:—

Class of '73, Sam Kimble; class of '74, E. F. Clark; class of '75, R. E. Lofinck; class of '76, Miss Nellie Sawyer; class of '77, Miss Ella Child, J. S. Griffing, and Wm. Ulrich; class of '78, C. S. McConnell; class of '79, A. T. Blain, H. C. Rushmore, and C. E. Wood; class of '80, Misses Emma Hoyt, Emma Knostman, and Grace Parker.

Fish Commissioner Long was one of the interested visitors at the College during Commencement week. Of course, he had to look over the fish-pond, which he pronounces a model of its kind, and one that the farmers of the State may imitate to advantage. This fish-pond, by the way, is about 40x15 feet, having a depth of water varying from two to four feet, and costing exactly $25.67. That the young carp are thriving, is shown by the fact that specimens have been seen fully six inches long, although when placed in the pond six weeks ago the largest were not over three inches in length.

COMMENCEMENT WEEK.

The regular exercises of Commencement week began with services in the Presbyterian Church, on Sunday evening, when President Fairchild delivered the Baccalaureate sermon, a large and attentive audience being present. The sermon, at the earnest request of the class, we publish in full in another place in this paper, where it may be enjoyed by all. The music on this occasion was furnished by Prof. Platt's class in singing; and we but speak the universal sentiment of those present on this occasion when we say that the class showed thorough training and faithful work on the part of teacher and pupils.

EXAMINATIONS.

Under this head we have little to state beyond the fact that the examinations were held in the several class-rooms and shops, in the order previously announced in the columns of the INDUSTRIALIST. During the progress of the examinations, a large and interested crowd, friends of the students and others, were present. This is as it should be: nothing encourages teacher and pupils so much as the presence, on occasions of this kind, of friends of the students and the College. The general report of the examination, as we learn from teachers and pupils, was very creditable to the students and their teachers. This, however, is no more than might have been expected. The last year has been the busiest one, taking the Institution as a whole, that the College has ever seen. In no previous year has so much real work been done as during the one just ended. During the entire year, not a single outbreak of unruliness, called by common courtesy a "student's freak," has occurred; and during all this time, as far as we are aware, no student has come before the Faculty for correction.

THE SOCIAL AND MUSICAL ENTERTAINMENT

was held in the chapel on Monday evening, a large assembly of students and friends being present. The musical portion of this truly enjoyable affair consisted of choruses, some of which were really grand, solos, duets, etc., by Prof. Platt's singing class, and instrumental pieces by the class taught by Prof. Hofer. The social part of this entertainment, which began as soon as the music ceased, was, to judge from appearances, heartily enjoyed by the students.

THE ANNUAL ADDRESS

was delivered in the Presbyterian Church, on Tuesday evening, by Hon. S. S. Benedict, of Wilson county. This address was an able and vigorous plea for the use of thought and education upon the farm. The speaker dealt with emphasis upon the relation sustained by the College to the agricultural community, giving the class some excellent advice concerning their duty to the State, and the manner in which that duty might best be performed. This very vigorous address was listened to with great interest by all of those present; and, coming as it did from an educated farmer, it had great weight with the audience.

The music on this occasion was furnished by the Manhattan String Band; and it is but justice to the band to say that we have rarely heard them do better, and never so *much*, as on this occasion.

THE COMMENCEMENT EXERCISES

proper began on Wednesday morning, at ten

o'clock, in the Presbyterian Church, which edifice was thoroughly occupied in all its parts long before the hour appointed for the exercises had arrived. We have no desire, in this article, to give our estimate of the orations given by the Class of '81, or to write a newspaper analysis of the same. We have never yet known a performance of this kind that was at all satisfactory, either to the individual members of the class, their friends, or the writer himself. The reporter of the commencement exercises of the young ladies' seminary, who can cover any defects of memory or analytical powers by abundant references to "three-button kids," "soft musical voice," and "showers of boquets," is the only exception to the above rule. But the reporter of an agricultural college commencement has no such resources; and so the views of the INDUSTRIALIST upon the individual productions of this class will never, we fear, be known. We will however say, that the pieces showed thought of the right kind, and the delivery was generally very good. We could have wished that less had been said about "evolution" and "progress," and more about the application of knowledge; but then our experience is that commencement orations show about as much of the man or woman as do the boquets which are hurled so vehemently at their heads when they make the final bow. We give below the speakers and their subjects in the order in which they appeared: —

Unfinished Work,	DALINDA MASON.
Every Man in his Place,	FLORA DONALDSON.
Look on the Bright Side,	WIRT S. MYERS.
Men of Character,	U. GRANT HOUSTON.
The Dawn of Science,	WILLIAM J. JEFFERY.
The Two Records of Creation,	FLETCHER M. JEFFERY.
Our Country's Claims,	WILLIAM J. LIGHTFOOT.
Study of Nature the Basis of Progress,	DARWIN S. LEACH.

THE ALUMNI.

The meeting of the society of Alumni was, on the whole, a pleasant affair. The sudden sickness of Mr. Gilbert, the orator, interfered materially with the programme as at first arranged. The society and his many friends were greatly disappointed by his inability to deliver the address.

After the business meeting and an industrious strolling over grounds and through buildings, the company, of about eighty persons, repaired to Prof. Walters' drawing-room, which had been suddenly transformed into a dining-room. The eight tables were tastefully spread with the luxuries of the season.

The following toasts were presented: "Our Alma Mater," response by Regent Wood; "The Faculty," response by President Fairchild; "The Alumni," by Sam Kimble, class of '73; "The Ladies," by Miss Nellie Sawyer, class of '76; "Our Absent Ones," H. C. Rushmore responded by reading several interesting letters from absent Alumni; "The Class of '81," by D. S. Leach. Each response was in well-chosen words. Hon. J. A. Anderson, our former President, was heartily called and responded in his own happy way.

The whole affair passed off the most pleasantly possible; and all felt it good to be there.

BOARD MEETING.

The Board met on the morning of Tuesday, June 7th, all being present except Regent Adamson, who was detained by pressing business.

Reports upon certain matters in the Land Department, were received from Regent Redden, Attorney, and from L. R. Elliott, Land Agent.

The degree of Bachelor of Science was, upon recommendation of the Faculty, conferred upon Misses Dalinda Mason and Flora Donaldson, and Messrs. U. Grant Houston, Fletcher M. Jeffery, William J. Jeffery, Darwin S. Leach, William J. Lightfoot, and Wirt S. Myers.

Expenditures were authorized for painting and plastering Mechanics' Hall, excepting the carpenter shop; for building a cistern in rear of Mechanics' Hall, with pump and tank for supplying water to shop, kitchen laboratory, and telegraph office; for renewing flues in Society Hall; for improvements in rooms occupied by Prof. Shelton; for protecting Laboratory tank against frost; for renewing hitching rails in rear of Mechanics' Hall; and for purchase of a pair of Angus cattle.

Committees of resident Regent, President of College and Professor over Department, were directed to devise plans for cases in geological and zoological cabinets.

A committee of President and superintendents was authorized to grade the wages of students by value of work, with ten cents an hour as maximum.

The President was directed to issue an advertising number of the INDUSTRIALIST, for general distribution over the State.

The Faculty were authorized to assign students of the second year to industrial classes in Agriculture and Horticulture, in connection with their class-room study.

Time was allowed for the perfecting of lists of books, ordered at previous meeting.

The Secretary was authorized to publish the annual reports of departments, and also quarterly statements of the financial condition of the College.

Vouchers Nos. 439 to 537, amounting to $4,745.62, were approved.

The Farm Superintendent was authorized to obtain a mowing machine.

All requests for increased salary, were referred to the Committee on Employes, with request that they report at the next meeting.

A vote of thanks was tendered to Hon. S. S. Benedict for his excellent address at the annual Commencement, with request for a copy to be published in the INDUSTRIALIST. Five hundred copies were ordered in pamphlet form.

The Board were unable to spend the usual time in examinations on account of the necessary early departure of several members.

The Board meet, by adjournment, at 9 A. M. of Tuesday, July 12th next, for the annual auditing of accounts.

THE FALL TERM.

The College year begins September 8th, with examinations for admission and assignment to classes. The Fall Term of fourteen weeks gives an excellent opportunity for review of studies preparatory to teaching, though its arrangement of studies is especially adapted to those who wish to enter upon one or more years of study.

The regular classes will have recitations as follows, beginning at 8:40 A. M.: —

First Hour.—Arithmetic. Algebra. Agriculture.

Second Hour.—Horticulture. General History. Meteorology.

Third Hour.—English Analysis. Physiology. Psychology.

Fourth Hour.—Chemistry. Trigonometry and Surveying. Hygiene.

Fifth Hour.—Drawing. Industrials.

Supplementary classes in Arithmetic, English Grammar, and Drawing will be organized, if needed, to accommodate various degrees of advancement. The industrial classes are so arranged as to avoid conflict with other studies and admit students of all grades of advancement.

All students are advised to take up studies in the order of the regular course, given elsewhere, because greater progress can be made by so doing; but every effort is made to give each student those studies which are best suited to his capacity. Under these restrictions, a choice of studies is always granted.

ENTERING COLLEGE.

Candidates for admission at the beginning of the fall or winter term, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

SPECIAL ADVANTAGES.

We enumerate a few of the special advantages which the Agricultural College presents to the young people of the State of Kansas:

First: Although an industrial school, as thorough and as complete an education — using the term in its popular sense — can be acquired here as in other schools. A student will make as rapid advancement here as elsewhere in the studies pursued, whether he remains here one or two years, or through the whole course.

Second: While obtaining a knowledge of English, mathematics, and the natural sciences, every student is learning some useful trade or art. This peculiar feature of the Agricultural College is a success. It should no longer be regarded as an experiment. Those who have been here one, two or three years are now in good positions, receiving good wages as telegraph operators, printers, carpenters, etc. Young men who have been through the course in practical agriculture and horticulture are rapidly becoming known as the best farmers in the localities in which they reside.

Third: The expenses are brought down to the lowest possible point. There are no matriculation fees, no tuition bills, no college customs which compel a useless expenditure for badges or dress. The expenses are simply the cost of living, and the text-books used.

Fourth: The high moral and religious influence which exists at Manhattan. The students of the Agricultural College are young men and women of excellent character. Their average age is about eighteen years. They are deeply in earnest in their efforts for advancement. Of course there are a few exceptions, but the vicious or shiftless are soon thrown out. "Attend to business or leave" is the one rule. A wholesome religious influence pervades the Institution. The students' weekly prayer-meeting has been well sustained for more than ten years.

EXPENSES OF THE COURSE.

Tuition is free, and no charges are made for incidental or "contingent" expenses.

Students in chemistry pay for the chemicals used by them in their laboratory practice and analysis, at cost prices.

Young men who take printing or telegraphy for their industrial, pay one dollar a month for the use of office and instruments. Young ladies are furnished these free, these two offices with the sewing and cooking departments being provided especially for their industrial education.

All other instruction furnished by assignment to classes is without expense to the student, beyond the necessary text-books. These can be procured at Manhattan at a cost of from two to five dollars a term. Those wishing to procury books before coming can learn what are used be inquiry.

Instrumental music is taught at the College in private lessons or small classes at the following

Prices per week:

Private lessons, 2 a week, on any instrument,	$1.00
Private lessons, 1 a week, on any instrument,	.60
Class lessons, 2 a week, on any instrument,	.65

This includes the use of the instrument. Instruction in harmony, etc., is furnished at from ten to fifty cents per weekly lesson, as the student may or may not receive other lessons.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.50 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

All personal expenses are made light by the spirit of economy pervading the Institution. Expenses, aside from clothing, range from fifty to one hundred and fifty dollars a year. These there is some opportunity to reduce by

EARNINGS.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed — outside of required hours of labor — upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour.

Many students obtain work in the village or upon neighboring farms, and so pay a part of their expenses. Students who work in the shops are allowed to work somewhat for their own profit in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses.

COLLEGE DUTIES AND PRIVILEGES.

All students are expected, unless excused by the Faculty, to attend chapel each morning of academic days, and divine service once each Sabbath in one of the city churches. Excuse must be rendered in case of absence.

Prompt attendance upon all class exercises is strictly enforced, and failure to render excuse for absence or tardiness is considered a misdemeanor. No student is allowed to withdraw from a class or from College without permission of the Faculty; and accurate and steady business habits are required to maintain one's standing in classes.

All daily exercises are graded in a scale of 100 for perfect; and at the close of each month an examination is held to test the work of each student, its result being graded in the same scale. An average monthly grade of 60 must be maintained to retain a place in the classes; and in cases where more than three studies are allowed, a grade of ninety or above must be secured in each study. Students failing to maintain their place in the classes are supposed to be wasting time and means, and their parents will be requested to take them home.

A permanent record of each student's standing in examination and classes, absences excused or unexcused, and general deportment, is preserved in the Secretary's office, showing upon a single page the actual progress throughout the course.

Declamations and compositions are required throughout the course, as a part of training in our mother tongue. Students in the third year present declamations before the whole College, after previous training in rehearsals; and fourth-year students present original pieces, after similar training.

The College library, containing a good selection of books and periodicals, is open daily during study hours; and students are allowed to draw books, under proper restrictions, for use at their rooms.

Two literary societies are maintained by the students, a room in one of the buildings being assigned for their exclusive use.

Members of the Faculty and more advanced students have organized a Scientific Club, for study and observation of facts in nature about us.

The monthly meetings of the Central Kansas Stock-breeders' Association and of the Manhattan Horticultural Society are held at the College, and are always open to students.

A singing class is taught by one of the Professors; and singing is a part of each morning's chapel exercises.

A weekly prayer-meeting is maintained by the students and members of the Faculty.

Regular monthly lectures upon topics connected with student life will be provided by members of the Faculty or invited celebrities.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. F. M. JEFFERY, President.
MISS GRACIA POPE, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
S. C. MASON, President.
R. A. HOLLENBERG, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

KANSAS STATE

AGRICULTURAL COLLEGE.

THE COURSE OF STUDY.

The necessity for so adjusting various branches of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. For this reason, almost all schools offering a real education present some well-defined arrangement for progress in studies, and call it a course. Such a course is not designed to be absolutely inflexible, but to guide towards a fair judgment of some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following outline gives the general scope of the two; but fuller explanations are found elsewhere: —

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Structure. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Analysis. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

DEPARTMENTS OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptations to the varying conditions of soil, climate and situation; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Planning farm buildings, barns, piggeries and stables. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; study of the forms of animals, as shown by the different breeds belonging to the College. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantage of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the basis and aims of the botanical classifications to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology,—in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,—variation, the improvement of varieties, parasitic fungi, are among the topics studied. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied Botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the text-book by the use of his eye and brain,—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and series of charts are used as means of illustration.

LANDSCAPE GARDENING.—The lectures on Landscape Gardening not only unfold the accepted principles of the art, but at the same time give special attention to such applications of the art as may be made universally available in laying out and improvement of farms and the homes of the people. These lectures are accompanied by a practical drill in the work of laying out and plotting grounds topographically.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. The instruction is presented in a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation; by buds, by seeds. Production of improved varieties, by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit, by bud propagation; budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning; gathering and storing fruits. Small-fruit culture. Lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is in the form of lectures. Illustrations are furnished from the individual collections of the students, from the entomological collections belonging to the Department, and detailed drawings and charts have been prepared, illustrating points of use in classification.

ZOOLOGY.—The time devoted to this study is principally given to a review of comparative anatomy and physiology. The latter portion of the term is occupied by a brief study of the system of zoological classification in present use, accompanied and illustrated by discussion and the study of fresh, alcoholic and mounted specimens.

INORGANIC CHEMISTRY.—This course is opened with a careful study of chemical forces and the laws governing chemical combination. The elements, with their compounds, are next considered in succession as to their history, properties, manufacture, and especially their uses on the farm and in the arts. These lectures are accompanied by an extended course of laboratory practice, in which each student performs every experiment with his own hands. Text-book, Eliot & Storer.

ORGANIC CHEMISTRY.—This comprises a thorough study of the chemistry of the organic compounds, the composition of plants and of the various compounds derived from them. It is accompanied by laboratory practice.

CHEMICAL ANALYSIS.—In this course each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. He here performs analyses of farm soils, plant ash, commercial manures, ores, mineral waters, commercial compounds, etc. After completing this course, he enters, if he desires, the Quantitative Laboratory, where he pursues a full course in quantitative analysis. Text-book, Kedzie's Manual.

MINERALOGY.—This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blow-pipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy.

GEOLOGY.—A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures to a class of young ladies, embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits, etc.

PHYSICS.—This includes a full consideration of the laws of mechanics, of liquids, gases and vapors, weights and measures, and specific gravity, followed by experimental study in the Physical Laboratory of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to plant and animal life.

METEOROLOGY.—Embracing the composition of the atmosphere; atmospheric pressure; temperature and humidity; laws of storms; rain, snow and atmospheric electricity. A full course in meteorological observations is taken under direction of the Signal Service. Text-book, Loomis' Meteorology.

ASSAYING AND PHARMACEUTICAL CHEMISTRY may be provided for by special arrangement, when students are qualified to pursue them.

ARITHMETIC.—One term is given to general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required. To those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry, in connection with technical drawing, involving the use of lines, angles and surfaces. During the second term, solid and spherical Geometry are studied. Practical problems, involving the principles demonstrated, are given to the class. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying; leveling—section and cross section; computation of earth-work; field practice, with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging lines and angles; construction of perpendiculars to given lines, intersecting and bisecting lines, triangles, four-sided figures and polygons, the circle and its secant lines, ellipses, and various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing.—After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and ornamentation are given occasionally.

Third Term.—Projection of the straight line and the circle; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible, clear, and forcible manuscript.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is followed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—The elements of United States History occupy a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to the study of general history in outline, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course continues through the entire term, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

HOUSEHOLD ECONOMY.—A series of lectures, accompanied by practical illustrations in the kitchen labratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and reasonable skill. Those who wish only a general acquaintance with these arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their studies: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen, while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from the framing to the stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is given a general view of the rise and progress of printing, of type-founding, stereotpying, electrotyping, and lithography. He is taught the implements or tools employed in typography, and how to use them; composition; imposition; principles and practice in plain and ornamental job work; presses and their workings; technical terms; and general duties of a first-class workman. The second course, the lessons of which alternate with those in the first, embraces instruction in spelling, capitalization, punctuation, proof-reading and correction; preparation of essays and criticisms on the same; and such other miscellaneous work as will make the student accurate and expert in language.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. One day in each week is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more rapid modes of telegraphy, including duplex, quadruplex, and the telephone, are explained.

Sewing.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting and trimming dresses and other garments. They may furnish materials and work for their own advantage during the hour of practice, under the direction of the superintendent.

THE INDUSTRIALIST

PUBLISHED BY THE PRINTING DEPARTMENT. KANSAS STATE AGRICULTURAL COLLEGE. SUBSCRIPTION—50 CTS. A YEAR, 10 CTS. A MONTH.

VOL. VI. MANHATTAN, KANSAS, SATURDAY, JULY 2, 1881. No. 44.

KANSAS STATE AGRICULTURAL COLLEGE.

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THE INDUSTRIALIST may be addressed through Prof. E. M. Shelton, Managing Editor. Subscriptions are received by Sup't A. A. Stewart.

DONATIONS for the Library or Museums should be sent to Prof. Ward, Librarian, or to Profs. Failyer and Popenoe, committee on Museums.

BILLS against the College should be presented monthly to the several heads of departments, or to the Secretary of the Board, at the College.

PAYMENTS on account of College funds, and from the College on approved bills, are made at the office of E. B. Purcell, Treasurer, in Manhattan.

QUESTIONS, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

GENERAL INFORMATION concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President.

LOANS upon school-district bonds are to be obtained from M. L. Ward, Loan Commissioner, who will furnish all necessary blanks and papers. Residence, Manhattan.

COLLEGE LANDS and all business connected with their sale are in charge of L. R. Elliott, Agent. Full particulars with descriptive map will be furnished upon application at his office, in Manhattan.

RAILROAD TIME-TABLES.

UNION PACIFIC RAILWAY.
KANSAS DIVISION.

No. 2, going East	12:20 P. M.
No. 4, going East	12:19 A. M.
No. 1, going West	4:00 P. M.
No. 3, going West	4:10 A. M.

M., A. & B. RAILWAY.

No. 2 leaves Manhattan	8:20 A. M
No. 1 arrives at Manhattan	7:40 P. M

The trains on this road connect closely at Burlingame with the A., T. & S. F. trains, both east and west.

GEO. C. WILDER, Agent.

A Farmer's Views on Education.

[An Address delivered by Senator S. S. Benedict, of Guilford, Kas., at the Twelfth Annual Commencement of the Kansas State Agricultural College, Tuesday evening, June 7th, 1881.]

It would doubtless seem an innovation in any other State but Kansas, for one whose profession was purely agricultural to attempt to address a body of college students, agricultural or otherwise, more especially a class who have completed their college course, and are supposed to be ready to go forth into the world, armed and equipped for life's great work, with what is now generally considered the one thing needful,—a practical education. But time-honored precedents rarely govern in Kansas; and the honorable gentlemen, the Regents of this Institution, not desiring, I suppose, to be outdone in the matter of violating precedents, have kindly extended to a farmer of Kansas an invitation to address you concerning a profession which I trust not only your tastes and inclinations, but your training at this Institution, will lead you to pursue; a profession which yields to none of the so-called learned professions, in affording opportunities for knowledge to be more pleasantly or profitably employed,—none which can be made more fruitful of thought, or which embraces a wider field for scientific research. It is to a subject which alone can make that profession a success, and attain for the agricultural class that rank and influence in society that the importance of their profession demands, that I wish to direct your attention this evening; that is, the great need of a more practical education for the agricultural classes, and how it can be best obtained.

Agriculture, as it was the first, is the most general occupation of man. It has been the chosen occupation of the great and good of every age. Warriors, philosophers, and statesmen, from King David to Washington, have made it their favorite employment. During the brightest period of Roman history, work upon the farm was the only manual labor worthy of a free citizen; and, from the first dawn until the decline of their literature, rural economy formed a favorite theme for composition, both in prose and verse. The works of Virgil, Cato, Varro, and Pliny attest the strong and enduring charm the subject of agriculture possessed for the Roman mind. Yet, notwithstanding the encomiums of poets, the praises of philosophers, and the example of statesmen, it is an undeniable fact, that there is no profession in life to-day which offers so little to attract the promising youth of our country, as farming; provided the lives of a majority of our farmers are examples of the lives they must lead, or their farms examples of the farms they must own and till. Why is this? My answer is, from the fact that it has long been a prevalent error that it was not necessary for farmers to possess anything more than an ordinary education; and even that was not absolutely essential to success, more being dependent upon industry and frugality,—in other words, muscle being at a premium and brains at a discount. It has often happened that, if one son in a family is supposed to possess more intellect than the others, he has been educated for one of the learned professions,—a lawyer, doctor, or minister,—while the others have been kept at home on the farm in comparative ignorance. Now, what would be the natural consequence of such proceedings? There can be but one answer,—agriculture has been degraded, until it is held, by a large class of people, as an employment that is merely an expenditure of so much brute force in the acquirement of a commodity with which to renew the system for another outlay. Agriculture has been said to be the Heaven-appointed employment of mankind. Now, in my opinion, Heaven never appointed mankind to live as some of our farmers do. If it did, there is something radically wrong with the appointing power. The daily life of a large class of farmers of this country, would hardly lend inspiration to the muses of the present day. Pastoral poetry to them would be regarded as a barren ideality, rather than an agricultural fact; and it would be as idle to talk of the ennobling influences of agriculture, as pursued by them, as of the generosity of the discounting business. There are two kinds of farmers who belong to this class. First, those who have implicit faith in a seed-time and harvest by a special order of providence, who put their seed into the ground, and leave it to fight its own way with weeds and natural enemies, have little intercourse with men of different occupations, habits or tastes from themselves, and gradually sink to the level of their surroundings, until each year finds them more idle, shiftless and ignorant, and their farms more neglected and unattractive. The other are those who place themselves on a level with the mule or ox, because mere bodily labor, unaided by intelligence, confers dignity on nothing higher than these animals. They work a little harder and scrape and pinch a little closer each year, until they begin to grow knock-kneed and prematurely old, their wives more bent and angular, and their children more discontented; having but one purpose in life, and that is to have their roll of bank stock "jest a little might bigger." The one, a son of toil, unaided by intelligence, who believes he has nothing to deal with except the land he plows, the stock he feeds, and the children he is rearing in ignorance; the other, a son of neither toil or intelligence, relying principally on the action of the moon or the peculiar signs of the zodiac for the success of his agricultural operations, ignorant of the fact that this is an age of progression, that results have ceased to happen without causes, and that, as a part of the great human family, he has no right to dam up the stream of progress; for the laws of progression are as unalterable as any others in nature, and that man who impedes them with an offspring of uneducated children, commits a sin which reacts not only on himself, but on his descendants long years in the future.

Now, I do not wish to be understood as attempting to convey the idea that a majority of the farmers of Kansas belong to either of these classes. The facts would not warrant such an assertion; but that they constitute too large an element of our agricultural population, is readily admitted by all who have been general observers. Now, the welfare of society and the prosperity of the State demands that the number embraced in these two classes should be reduced to the minimum. What are the best means to employ to bring about that result? In my opinion, the only sure remedy lies in the better education of the agricultural classes, both theoretically and practically.

In most trades and professions, a thorough education or training is considered requisite for success; and a person is looked upon with distrust if he advocates to do things before he has learned how. An office with a few medical works, old bottles, and pill bags, even with a certificate of the medical board created under the act to regulate the practice of medicine in Kansas, thrown in, is no evidence of a successful practitioner: the first case he treats, he may prove himself a quack of the first water. It is not these external evidences, but the thorough knowledge of his profession, that enables him to reasonably expect success. And if the doctor who practices his profession without having prepared therefor by previous theoretical study, is considered a quack, why should not the farmer who pretends to pursue the best methods of agriculture, without a competent knowledge of its fundamental science, be classed in the same category? Now, those who desire to prepare themselves for one of the learned professions, whether a lawyer, doctor, or minister,—and I have named them in the order they are usually remunerative, because I have great confidence in the old adage "that when a man would pay twenty-five cents for his salvation, fifty cents to be made well when he was sick, he would willingly pay five dollars to have his own way,"—have long been provided with the opportunities for gaining the education and training that is required in their respective professions. The course of study in all the leading literary colleges of New England, varies little to-day from that pursued by our ancestors a century ago; and that comprises what the best disciplinarians of the human mind, in centuries gone by, have marked out as the most desirable path for professional men to travel, previous to the special training that each receives in purely professional institutions. The expense attending a four years' course at these literary institutions, totally prevents the sons of comparatively poor farmers from availing themselves of these vehicles of education, provided he could raise more corn or wheat to the acre, through his skill in higher mathematics, or pursue a more judicious system in the rotation of his crops, by his being able to write Ciceronian Latin, or of his learning in Greek roots. Now, what opportunities have been afforded the youths who are to become the farmers of the country for special training in their professions. None at all, until the present generation. Farmers frequently gave their sons a liberal education, but not that they might more intelligently till the ancestral acres, but that they might adorn one of the learned professions, and thus avoid the monotonous, plodding life that their ancestors had pursued. To tell them that their education was as essential to successful farming, and propose that their sons shall apply it in that profession, and they would at once relent their munificence and count it lost.

Agricultural colleges are children of the present generation. Thirty years ago they would have been considered almost universally a farce, totally useless for the promotion of agriculture; and an advocate of such an institution would have drawn out from the professional educators of that day more irony and sarcasm than any appropriation bill for the benefit of this Institution ever did from the lips of our cultured professional gentlemen, four-fifths of whose constituents were farmers. For many years, they also fell into the hands of the pedagogue classes, who made them mere mills for the manufacture of the poorest pattern of professional men, where the teaching and practice of agriculture was a mere side-show, and in no wise tended to advance the farming interests of the country. They were agricultural in name only; and, to a great extent, merited the ridicule of those who thought the munificent grant of the government had been diverted to foster a system of education widely different from that intended by its authors.

I must confess that I have never believed there existed a college or school that could teach farming. That is beyond the power of any educational institution; but there is a great and important work for agricultural colleges to perform which cannot well be done elsewhere, and that work is the cultivation of the mind for the more perfect un-

derstanding of the every-day operations of the farm, and the principles upon which they are based. And I believe the majority of these institutions are to-day working in their legitimate sphere; and, while we can not say that the course of study in these institutions is the wisest possible, we must remember that we cannot expect ripeness without age. And, as they have graduated but few crops of young men, doubting professionals should not be too critical or too eager to enforce their opinions in the management of these institutions, until their efficiency in the cause of practical education and the development of the great science of agriculture, on which depends more than any other the welfare and happiness of the human family, is fairly tested.

Our professional men are too apt to overlook the changed condition of this country during the past generation, its forward progress in all the economic sciences and industries, and the greater proportion of our young men who desire a scientific rather than a collegiate education. Modern discovery marks other needs of learning and culture than the ability of learned disquisition. It finds humanity crowding the earth's surface, and attempting to build up a civilization which demands that trained minds shall direct trained hands, and that it is a sad mistake to refuse to any person that kind of a training that would better enable him to do life's work. Our agricultural colleges and industrial schools are the outgrowth of such lines of thought: they are the attempt of an earnest, thoughtful people to accomplish a distinct end; and that is, to educate the farmers of the conntry, to diffuse the light of science in the rural home, and to make the culture of the soil a profession that will improve, elevate and ennoble mankind.

Now, this want long felt by the more thoughtful of the agricultural class, has been supplied. Through the generosity of the Government and State, we have an Institution here whose portals are opened, almost without cost, to the whole farming community. Here they can acquire a knowledge of all the sciences that underlie their calling, witness and take part in the laboratory and outdoor experiments and tests, and become familiar with the improved machinery applicable to agriculture and the various processes of soil cultivation. It is this training, a thorough preparation for their chosen career, which these government-chartered institutions munificently offer to the farming community; and, if it will be accepted in the same spirit in which it was offered, and our coming farmers become thoroughly educated, theoretically and practically, in their positions, a new day will dawn upon the agricultural interests of our State, and farmers will not hereafter be attempting to solve the same questions which baffled their forefathers.

It should be a source of humiliation to every intelligent, thoughtful farmer that the skill exercised in the management of commerce, manufactures and the mechanic arts, is so far superior to that shown in agriculture. Scarcely any of the improved machinery, which so facilitates and cheapens his labor, is the product of his own inventive genus. The amateur farmer, or some outsider who had observed the need of such helps in farm operations, has, in almost every instance, furnished him with these inventions. Why is this? No better minds have been engaged in the one than in the other, but more study, thought and mental energy have been devoted to the one than to the other. This has made the difference. It should not exist; and, if our agricultural colleges shall raise the standard of excellence in farming in this country, they certainly will have the good wishes and hearty co-operation of all.

Now, how can our agricultural colleges be better made a success? or, in other words, how can the young farmers of the State be induced to avail themselves of its beneficial influence? First, by creating a desire for a scientific education. In my opinion, this education should begin in our common schools. The rudiments of agricultural science should be taught there. Here the minds of a vast majority of young Americans receive their earliest and most impressive training. This is the common nursery of knowledge for the people. Here the young mind should imbibe, in its simplest forms, the elements of all the natural sciences. They are no more beyond the comprehension of young minds than arithmetic or grammar: they can be taught with objects to aid the understanding; and, in this way, the child can comprehend as easily as the philosopher.

The routine farmer is wont to impress upon his son's mind that farming consists merely in the practical manipulations which he sees and assists in on the farm. The son, hence, infers that farming is mere drudgery and nothing else; and he longs for something that will call out his mental energies, and thus he escapes from the farm into anything that will satisfy this desire. But when the rudiments of agricultural science shall be taught in our common schools; when the farmer's boy finds that agriculture is an intellectual pursuit, that it is of sufficient importance to be taught at school, that the most learned professors may here find scope for all their learning,—this changes the whole picture. What was comparative drudgery becomes a manly exercise when directed by science, and his respect for his father's calling greatly increases. The parent himself will divert himself of his prejudices, and see that books are as necessary to the farmer as to the lawyer or doctor. These studies in the common schools will develop the aptitude of the boys for the college course, and our agricultural colleges will be a signal success everywhere. Hundreds, who would not otherwise have their attention turned to it, would here find delight in the study of these sciences; and they will drift to the college where this taste can be gratified.

There is, however, another university in the land, which we all can patronize at home by the fireside. I believe it was Chas. Francis Adams who said, "that the reading of books and newspapers was the poor man's university." Now, books and newspapers are made to spread intelligence; and to the farmer, above all other men, are they a necessity, from the fact that they afford him, in his comparative isolated condition, the only means of mingling in the busy scenes of life. As a rule, farmers have little intercourse with each other; their minds are not sharpened by the friction of society, where new ideas are suggested and developed by association; they need something to stimulate thought and develop more mental activity. There is no business that affords greater scope for thought than farming. The careful farmer is daily meeting with subjects which challenge thought, and require the most profound study. The balancing of cause and effect, wherein a thousand causes are operating, demands as much thought and as philosophical a turn of mind as any other profession in life. You never find a successful professional man but what keeps himself supplied with the latest publications relative to his daily work; yet I do not suppose there is one in twenty of the farmers of Kansas, or any other State for that matter, that takes an agricultural paper, or possesses a half dozen standard works on subjects connected with his profession. Many are naturally prejudiced against "book farming." They regard it as a term of reproach; and it certainly is a name which the old-fashioned farmer most of all dreads. Their prejudices against every new improvement are still unconquered. They are not only yet voting for Jackson, but claim the old wooden mouldboard plow the best after all, because it won't rust. Others say they can't afford to take an agricultural paper. This class generally sell all their best meats and choicest fruits and grains for greenbacks, and leave for family consumption the offal of their farms, whatever cannot, by any amount of pinching and turning, be converted into the almighty dollar; doing monotonous and servile labor with their own hands, and denying themselves and their families the commonest comforts and conveniences of life. Is it any wonder that they complain that their sons grow up with a dislike to farming as an employment for life; and leave it the first opportunity they have to escape from such parental serfdom and degradation?

How different the surroundings of the farmer's home where the newspapers are regular visitors. He has not acquired all his agricultural information by bitter experience; but has been in constant communication with many of the most successful farmers of the country, who give him the benefit of their observation and experiments, through the columns of his agricultural journal. I believe it is perfectly safe to say, that the agricultural press has been superior to any other agency in improving the agriculture of this country.

A book or paper on some technical subject, is usually the record of an experience. An experience is valuable in proportion as it is accurate. It is valuable because, under like circumstances, we may know what results to expect in a given course. Without the experience of others to guide us, the world would make no progress: each generation would begin at the same point, end at the same, and be of no use to the world at large. The energetic, progressive farmer is not content to do as his father did before him, and suppose there is nothing more to learn. Farming is not an exact science, with demonstrations of unvarying regularity, but one of the most uncertain in its results of all human employments, because of the complex circumstances that enter into the calculations. The varieties of soil, of weather and culture, a literal multitude of contingencies, bring up new questions at every step, and make every result more or less doubtful. And for a farmer, of a few years of personal experience and observation in the culture of the soil, to assume that he knows so much about it that he cannot afford to give a few dollars for papers and books each year, that he may know what others have learned in the same field of labor, or to know how and why they failed, is a pretended assumption of independence, but in reality an exhibition of his mental weakness. But I would by no means advocate strictly "book farming." I have found out by experience that a great many fine-spun theories of kid-gloved farmer editors, if followed out, make farming pay on paper and nowhere else. There is altogether too much inaccuracy and looseness of statement in many agricultural papers: too many theories are given as facts; and they are usually stated in such positive form as almost to surprise one into the belief of them, when an investigation will prove them mere speculations and nothing else. But the actual experiments of practical farmers that are given to the world through the medium of the press, are decidedly advantageous to every farmer in the land, and should be always welcomed. Nothing gives his mind a more enquiring tone, than familiarity with the views of others: it tends to stimulate thought, suggest inquiries and comparisons, and in a score of ways makes his profession more profitable and attractive. These two agencies,— the practical education of our youth in all the sciences relating to agriculture in our common schools, supplemented by a similar yet advanced course of instruction, fully illustrated and carefully tested by accurate experiments at the Agricultural College, and the agricultural press,— are, in my opinion, the most powerful instrumentalities we have for giving the agricultural classes that education that the importance and welfare of their profession demands.

There is but one other suggestion that I desire to call your attention to, young men, most of whom I trust will, in the near future, honor the profession that will always be of transcendant importance in Kansas, and that is the influence you can exert in your respective localities, illustrating by example the theories you have been taught, and the tests and experiments you have witnessed as students of this Institution. The State expects this missionary work of you, in return for the generosity it has displayed in giving you these advantages. The field is large, and affords ample room for the exertion of all your faculties.

Put not your light under a bushel. The future prosperity of your Alma Mater depends to a great extent upon the impression her children make upon their respective communities, when they go forth into the world to engage in the active duties of life. The people will always judge our schools by the fruit they have borne the community; and, if they fail to bear any fruit of first quality, there will be a clamor for change of policy. Unless you can illustrate the advantages of a scientific education in the profession of agriculture in a practical manner, either by the raising of larger crops per acre, or of finer stock of all kinds, or in the improvement of your farm, than your neighbor who is prejudiced against book farming, your agricultural attainments will be considered a delusion, and the Agricultural College a failure as a means of promoting practical agriculture, and a useless burden upon the property-owners of the State. Do not, however, attempt to create the impression among your neighbors that you know it all, because you will be greatly mistaken: you will not be near as apt to know as much of practical life, in many of its phases, as the boys who staid at home, besides your influence for good would be greatly lessened. The instruction you have here received should prove to you, that your education has just begun. Never engage in argument with old-fashioned, non-progressive farmers, because there was never one yet converted in that way; but try and illustrate by your example the advantages of progression in agriculture as in everything else, and let them see with their own eyes the superiority of work performed by trained hands when directed by trained minds.

Show to your conservative neighbors the advantages of an education which may be useful through life. Endeavor to create a desire among the young of this class for this kind of knowledge; for, although from the earliest hours of infancy until the closing time of life man never ceases to learn, the days of his youth form the golden period for laying the foundation. If these are lost to him, they can never be fully replaced, or their deficiency supplied in after life. Above all, young men and women, fail not to profit by the instruction and discipline you have received here. A college course has many advantages aside from the course of instruction laid down in the catalogue. One of the most pleasing and characteristic features of college life that I can now recall, and which made for itself a sacred place in my remembrance, was the thoroughly democratic spirit that pervaded it. Here you come together from all parts of the State, and from different ranks in society; and, whether the sons of those who have been able to rear you in comparative affluence, or of that class, by far the most numerous in Kansas, who enjoy the only ancestral distinction of having "poor but honest parents," you all leave at your homes the advantages or disadvantages of birth, and meet here on the same plane of respectability and honor. The warm hand of fellowship is extended to every individual, and he stands entirely upon his own merits as a man, regardless of the texture of his clothes, the extent of his purse, or the quality of blood that happens to course in his veins. Hence, you are bound together by a bond of sympathy so strong that nothing of good or evil can affect one without affecting the whole community. This is the peculiar charm of college life; and it cannot fail of producing a lasting impression upon each one of you, in the formation of your future character. Arrogate to yourself no superior worth by reason of any advantages you may possess, or any successes that may attend you in the future. Be broad-gauged, and liberal-minded; build not yourselves up by pulling others down; strive to counteract the baneful influences of those political adventurers who would array one class against another, and whose victims have been too numerous among the careless, unreflecting tillers of the soil; remember that all trades, pursuits, and industries are mutually dependent upon each other, and each is more or less interested and benefited by the success and prosperity of the other. Whatever our occupation, we are one great whole; and as such, our prosperity must be found in harmony, not in conflict.

Then, in conclusion, let me say to you young men who intend to follow the profession of agriculture, honor and exalt your occupation. Feel the dignity of labor when coupled with intelligence and refinement. Let the world see that you embraced it, not because there was no other employment for you, but because you were in love with it. No one ever made a success of a profession in which he was not contented. Living in a State whose agricultural resources are in many respects unrivaled, protected by laws which ever ought to reflect the wisdom of men of his profession, the intelligent farmer of Kansas may look forward to continued prosperity, to a life of comfort if not of affluence, and to the enjoyment of a position which, if rightfully filled, will redound to the honor of the State, and gain for him the respect of all who are assisting in building up the highest type of true American civilization.

THE Association of Agricultural Teachers —Prof. Morrow, of Illinois, president — met at the Michigan State Agricultural College, June 28th to 30th, and discussed questions important to successful teaching of principles in agriculture. The Association holds its next meeting at the Iowa Agricultural College, Prof. Knapp, of Iowa, president.

THE INDUSTRIALIST.

SATURDAY, JULY 2, 1881.

E. M. SHELTON, Managing Editor.

ASSOCIATE EDITORS, MEMBERS OF THE FACULTY.

CALENDAR.

1881-2.

FALL TERM,—September 8th to December 16th.
WINTER TERM,—January 3d to March 24th.
SPRING TERM,—March 27th to June 7th.
June 7th, Commencement.

1882-3.

FALL TERM,—September 14th to December 21st.

BONDS WANTED.

The highest market price paid for school bonds, bridge bonds, or other safe securities, by the Loan Commissioner. Correspondence solicited.

M. L. WARD, Loan Commissioner.

This number of the INDUSTRIALIST is sent to many persons known to be interested in agriculture, with the hope that they may be also interested in education for farmers' sons and daughters. Effort is made to give, along with the admirable address of Senator Benedict, as full information of the College and its ways as space will allow. Further particulars will be furnished gladly upon application.

The average attendance of students during the year past has been much larger than in previous years, reaching very near to two hundred. The whole number of students has been 267, of whom 88 were ladies. They are classified as follows:—

Resident Graduates	2
Fourth Year	9
Third Year	24
Second Year	48
First Year	178
Select Course	6
Total	267

The following 43 counties of Kansas send students:—

Allen.	Ellsworth.	Rice.
Anderson.	Franklin.	Riley.
Bourbon.	Greenwood.	Rush.
Butler.	Jackson.	Saline.
Chase.	Jefferson.	Sedgwick.
Chautauqua.	Jewell.	Shawnee.
Cherokee.	Leavenworth.	Smith.
Clark.	Lincoln.	Sumner.
Clay.	Lyon.	Trego.
Coffey.	Marion.	Wabaunsee.
Cowley.	McPherson.	Washington.
Davis.	Mitchell.	Wilson.
Dickinson.	Nemaha.	Wyandotte.
Doniphan.	Osborne.	
Douglas.	Pottawatomie.	

Students from other States have represented Illinois, Michigan, Missouri, Ohio and Indiana.

ENTERING COLLEGE.

Applicants for admission at the beginning of the year, in September, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic to percentage, geography, and the elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the classes from the first.

Applicants of mature age and slight advantages may be received upon special conditions, though unable to pass the full examination.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer.

All applications should be made to the President of the College, who will furnish information as to rooms and boarding places as well as college duties.

Students should bring letters of recommendation from home, or from the school last attended, that they may at once find friends, if possible, in this their new home.

Upon arriving, each should leave bulky baggage at the depot until a boarding place is secured, and at once enquire for the President's office at the College. Not an hour should be lost in completing arrangements for immediate work. Having found a place to live, each student, new or old, is expected to notify the President where his room is.

Not a day should be lost from the classes, if arrangements are possible without it.

THE FALL TERM.

The College year begins September 8th, with examinations for admission and assignment to classes. The Fall Term of fourteen weeks gives an excellent opportunity for review of studies preparatory to teaching, though its arrangement of studies is especially adapted to those who wish to enter upon one or more years of study.

The regular classes will have recitations as follows, beginning at 8:40 A. M.:—

First Hour.—Arithmetic. Algebra. Agriculture.

Second Hour.—Horticulture. General History. Meteorology.

Third Hour.—English Analysis. Physiology. Psychology.

Fourth Hour.—Chemistry. Trigonometry and Surveying. Hygiene.

Fifth Hour.—Drawing. Industrials.

Supplementary classes in Arithmetic, English Grammar, and Drawing will be organized, if needed, to accommodate various degrees of advancement. The industrial classes are so arranged as to avoid conflict with other studies and admit students of all grades of advancement.

All students are advised to take up studies in the order of the regular course, given elsewhere, because greater progress can be made by so doing; but every effort is made to give each student those studies which are best suited to his capacity. Under these restrictions, a choice of studies is always granted.

EXPENSES OF THE COURSE.

Tuition is free; and no general fee for incidental or contingent expenses is charged. In a few special departments of instruction, the following payments are required in advance:—

In analytical chemistry, students pay three dollars a term for chemicals and apparatus used in their laboratory practice and analysis.

In the printing-office, young men, in their first year, pay three dollars a term for office expenses. Advanced students have the use of the office for the work performed during industrial hours.

In telegraphy, young men pay three dollars a term for office expenses.

Young ladies are furnished both printing and telegraphy free of expense, these two offices, with the sewing and the cooking departments, being provided especially for their industrial training.

Lessons in instrumental music are from five to fourteen dollars a term, according to the number of lessons.

Vocal music is taught in classes, at an average expense of one dollar a term.

The necessary text-books can be procured in Manhattan, at a cost of from two to five dollars a term.

Board and washing are not furnished by the College. Board can be procured in private families at from $2.75 to $3.50 per week, and in some boarding houses for $1.50 per week. Some students board themselves at even less cost; and rooms for that purpose can be obtained at a rent of from $1.00 to $2.50 a month. Washing costs from fifty cents to one dollar a dozen pieces.

Ordinary expenditures, aside from clothing and traveling expenses, range from $60 to $150 a year.

LABOR AND EARNINGS.

The course of study is framed with especial reference to the wants of laboring men and women; and every encouragement is given to habits of daily manual labor during the College course. Only the one hour of daily practice in the industrial departments is required; but students are encouraged to make use of other opportunities for adding to their ability and means.

Everywhere the student who works, wins respect; and it is a matter of pride to earn one's way as far as possible.

The College employs students, when possible, on the farm and in the gardens, shops and offices, paying wages at an average rate of eight cents an hour.

All labor at the College is under the direction of the superintendents of departments, and offers opportunity for increasing skill and efficiency. In regular weekly settlements, the students are required to observe business forms and principles, showing from their daily account when and where the work was performed. A few students who have shown especial efficiency are employed during the summer vacation.

The labor of students in the industrial departments is principally a part of their education, and is not paid for, unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Some students are so employed upon the farm, in the gardens or the shops, and about the buildings. This labor, in limited quantities, is paid for at rates, varying with service rendered, from seven to ten cents an hour. The superintendents strive to adjust their work to the necessities of students, and give them the preference in all tasks suitable for their employment. So far as practicable, the work of the shops and offices is turned to account for their benefit; and the increasing extent of the grounds and sample gardens brings more of such labor.

Many students obtain work in the city or upon neighboring farms, and so pay a part of their expenses. Students employed in the shops are allowed to work somewhat for their own profit, in manufacture of articles for sale or use. In these ways a few students are able to earn their way through College. The amount so earned will vary with the taste and zeal of the student. The majority must expect to provide by earnings outside of term-time or from other sources for the larger part of their expenses. The long summer vacation of three months offers opportunity for farm or other remunerative labor; and no one need despair of gaining an education, if he has the ability to use his opportunities well.

GENERAL DUTIES AND PRIVILEGES.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met by prompt dismissal. No other rules and regulations are announced.

REGULAR EXERCISES.—*Classes* are in session every week-day except Saturday, and no student may be absent without excuse. Students enrolled in any term cannot honorably leave College before the close of term, unless excused beforehand by the Faculty. A full and permanent record of attendance, scholarship and deportment, shows to each student his standing in College. After each monthly examination, a report of advancement is made to parents; and any student, upon leaving College at the close of a term, may receive a certificate of standing.

Chapel exercises occupy fifteen minutes before the meeting of classes each morning, and unnecessary absence from them is noted in the grades.

Lectures, etc.—Twice in each month the whole body of students gather for a lecture from some member of the Faculty, or for the rhetorical exercises of the third and fourth year classes. On alternate weeks, all the classes meet at the same hour, in separate class-rooms, for exercises in elocution and correct expression.

Every Friday evening a students' prayer-meeting is held in the College Society-room, lead by a member of the Faculty. On the Sabbath, students are expected to attend services at least once in the different churches of the city.

Occasionally during each term, the College building is opened for a social gathering of Faculty and students, in which music, literary exercises and friendly greeting find place.

VOCAL MUSIC.—Excellent instruction in vocal music, for beginners and for advanced students, is furnished at a very slight expense, under the direction of Prof. Platt, with whom all arrangements for entering these classes may be made. Each class has two lessons a week, at an average expense of one dollar a term.

SOCIETIES.—There are two prosperous literary societies of at least ten years' standing. Both have libraries and meet weekly in their own room in Societies' Hall. The *Alpha Beta* is open to students of both sexes, and holds its meetings Friday afternoon. The *Webster* admits to membership gentlemen only, and meets on Saturday evening.

Members of the Faculty, with advanced students, have a Scientific Club, which meets in the Chemical Laboratory on the first Friday evening of each month.

The Central Kansas Stock-breeders' Association and the Manhattan Horticultural Society have monthly meetings,—usually at the College,—which students have the privilege of attending.

ENDOWMENT.

An act of Congress, approved July 2d, 1862, gave to each State public lands to the amount of 30,000 acres for each of the Senators and Representatives in Congress according to the census of 1860, for the "endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, * * *, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Under this act, the State of Kansas received 82,313.53 acres of land; and in 1863 established the State Agricultural College, by endowing with these lands Bluemont College, which had been erected near Manhattan, under the auspices of the M. E. Church, but was presented to the State for the purpose named in the act of Congress. Of these lands, 62,127.89 acres are now sold, giving a fund of over $320,000, which is by law invested in bonds, the interest alone being used for current expenses of the College. There remain unsold 20,185.64 acres of land, lying in Riley, Dickinson, Washington, and Marshall counties, appraised at over $150,000.

In 1873 the College was reorganized upon a thoroughly industrial basis, with prominence given to practical agriculture and related sciences; and in 1875 the furniture and apparatus of the College were moved to buildings upon the farm of 155 acres, one mile nearer the city of Manhattan. On this fine location, the State has erected buildings valued at $40,000, and has made an appropriation of $30,000 for their further extension during the years 1881 and 1882.

OBJECTS.

This College now proposes to carry out the objects of its endowment, in several ways.

First, it gives a substantial education to men and women, in all the walks of life. Such general information and discipline of mind and character as help to make intelligent and useful citizens, are offered in all its departments, while the students are kept in sympathy with the callings of the people.

Second, it teaches the sciences applied to the various industries of farm, shops, and home. Chemistry, botany, entomology, zoology, and mechanics are made prominent means of education to quick observation and accurate judgment. Careful study of the minerals, plants, and animals themselves, illustrates and fixes the daily lesson. At the same time, lessons in agriculture and horticulture show the applications of science; and both are enforced by actual experience.

Third, it trains in the elements of the arts themselves, and imparts such skill as makes the hands ready instruments of thoughtful brains. The drill of the shops, gardens and farm is made part of a general education to usefulness, and insures a means of living to all who make good use of it. At the same time, it preserves habits of industry and manual exertion, and cultivates a taste for rural and domestic pursuits.

Fourth, it strives to increase our experimental knowledge of agriculture and horticulture. So far as means and circumstances permit, experiments are undertaken with a view to more definite results than ordinary experience can give. By this method, the students themselves are trained to a more accurate observation and judgment in these practical tests of principles in farming.

Fifth, it seeks to disseminate such practical truths as have stood the test of scientific inquiry. For this purpose it publishes the weekly INDUSTRIALIST; and its officers share in the debates and consultations of farmers and horticulturists throughout the State.

COLLEGE SOCIETIES.

ALPHA BETA.—Chartered, December 26th, 1870. Meets in the Society Hall every Friday at 2 P. M. Ladies admitted. New students cordially invited to attend. F. M. JEFFERY, President.
MISS GRACIA POPE, Secretary.

WEBSTER.—Chartered, January, 1871. Meets in Society Hall every Saturday evening. Visitors, especially students, always welcome.
S. C. MASON, President.
R. A. HOLLENBERG, Secretary.

SCIENTIFIC CLUB.—Meets on first Friday evening of each month. Composed of members of the Faculty and advanced students. Devoted to the improvement of its members in general scientific knowledge, and the encouragement of original investigations. PROF. POPENOE, President.
S. C. MASON, Secretary.

KANSAS STATE

AGRICULTURAL COLLEGE.

COURSES OF STUDY.

The necessity for so adjusting various branches of a course of study that there shall be as little waste as possible in acquiring both information and discipline, is felt by every teacher. Such a course is not designed to be absolutely inflexible, but to guide the judgment into some definite line of progress from which no mere whim shall turn a student aside.

With such views, this College offers a general course of study, designed to promote genuine knowledge and thorough discipline, so far as it may extend. With the studies here laid down, there will always be sound training in morals and social proprieties, and some drill in elocution. Carefully adjusted to its different parts, are courses of training in the industrial arts. Agriculture, Horticulture, Carpentry, Printing, Telegraphy, Sewing and Cooking, are especially provided for. Some one of these each student is required to practice, being allowed a choice with advice from the Faculty. Instrumental and vocal music, though not a part of the curriculum, find a place in the general machinery.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following gives the general scope of the two; but fuller explanations are found under OUTLINE OF INSTRUCTION:—

GENERAL COURSE OF STUDY.

FIRST YEAR.	FALL TERM.	Arithmetic. English Analysis. Geometrical Drawing.
	WINTER TERM.	Book-keeping. English Structure. United States History.
	SPRING TERM.	Algebra. English Composition. Botany, with Drawing.
SECOND YEAR.	FALL TERM.	Algebra. Elementary Chemistry. Horticulture.
	WINTER TERM.	Geometry, with Drawing. Practical Agriculture, or Household Economy. Organ. Chemistry. Mineralogy.
	SPRING TERM.	Geometry. Entomology. Anatomy. Analyt'al Chemistry, or Household Chemistry and Economy.
THIRD YEAR.	FALL TERM.	Trigonometry and Surveying. Physiology. General History.
	WINTER TERM.	Mechanics, with Drawing. Agricultural Chemistry. Rhetoric.
	SPRING TERM.	Civil Engineering. Chemical Physics. English Literature.
FOURTH YEAR.	FALL TERM.	Agriculture, or Spec'l Hygiene. Meteorology. Psychology.
	WINTER TERM.	Logic; Deductive, Inductive. Zoology. United States Constitution.
	SPRING TERM.	Geology. Botany and Gardening. Political Economy.

OUTLINE OF INSTRUCTION.

PRACTICAL AGRICULTURE.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds; their adaptation to the varying conditions of soil. climate and situation; study of the forms of animals, as shown by the different breeds belonging to the College; the relation of stock-raising to general farming. Cultivation of hoed crops; management of corn and roots in reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas; the best sorts for the State, and their management, as shown by experiments on the College farm and elsewhere. Implements of simple tillage; mechanical principles involved in their construction. Application of labor. Draught; different adjustments, as affecting draught. Use of the dynamometer. Plows for soil and subsoil. Draining; soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals. The laws of heredity of disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross breeding; influences affecting fecundity; The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops; general advantages of a rotation; the best rotation for distribution of labor, production of manure, and extermination of weeds; planning farm buildings, barns, piggeries and stables. Manures; how best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production; stall-feeding; soiling.

HORTICULTURE.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard and garden. Barry's Fruit Garden is used, supplemented by a series of lectures upon the following topics, among others: The scope of Horticulture. General principles of propagation,—by buds, by seeds. Production of improved varieties,—by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruit by bud propagation,—budding, grafting, layering, etc. The important points in nursery manipulation. The orchard; conditions of site, soil, exposure, elevation. Special treatment of the different kinds of fruit trees. Pruning. Gathering and storing fruits. Small-fruit culture; lists of varieties suitable for Kansas planting. Vegetable garden; selection and preservation of seed; planting and transplanting. The management and use of the hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

BOTANY.—During the course, two terms are given to the study of Botany. In the spring term, first year, the student is familiarized with the babasis and aims of botanical classification to a sufficient degree to enable him to appreciate differences and resemblances in the plant kingdom, and is made acquainted with the salient points in plant physiology. Gray's Manual and Lessons is the text-book. In the spring term, fourth year, the intimate structure of plants, a more detailed study of plant physiology, (in the germination of seed, the growth of cellular substance, and the fertilization of the ovule,) variation, the improvement of varieties, parasitic fungi, are among the topics studied. The instruction in this part of the course is principally given as lectures. A portion of this term is devoted to the principles of Landscape Gardening.

Although it is in a large degree the aim of this course in Botany to furnish a foundation for the study of applied botany in agriculture and horticulture, the advantages of systematic observation and original investigation are kept in view; and the student anticipates the use of the textbook by the use of his eye and brain.—observing and comparing seeds, leaves, stems, flowers, and other portions of plants, keeping notes of his observations for presentation in the class. The plan is followed through the course, with each new topic. A good herbarium and a series of charts are used as means of illustration.

CHEMISTRY.—*Inorganic Chemistry*, which occupies fourteen weeks of the second year, includes a consideration of chemical forces and of the laws of chemical combination, with nomenclature and formulæ, and a careful study of the history, manufacture, physical, chemical and physiological properties, tests and uses, of the various elements and their compounds. Especial attention is given to those substances having extended application in the arts. In addition to the usual lecture-room experiments, the student repeats, as far as practicable, all this experimental work at his private work-table.

Organic Chemistry comprises a six weeks' course of lectures upon the theory of organic types and compound radicals, and the preparation and properties of those organic substances most useful to man.

In *Chemical Analysis*, each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. His work includes the analysis of more or less complex mixtures of chemicals, minerals, ores, soils, mineral waters, well waters, etc. The time given to this work is two hours daily for eleven weeks. Text-book, Kedzie's Manual.

AGRICULTURAL CHEMISTRY.—This includes a thorough consideration of the application of chemical principles to the economy of the farm; the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations, such as plowing, fallowing, draining, etc. Text-book, Johnson's "How Crops Feed."

HOUSEHOLD CHEMISTRY.—A course of lectures on this subject is delivered each year to a class of young ladies. The course embraces the chemistry of cooking; the composition of food; bread; tea, chocolate and coffee; butter and milk; ripening and preservation of fruits; etc.

HOUSEHOLD ECONOMY.—A series of lectures to the ladies of the second-year class, accompanied by practical illustration in the kitchen laboratory, continues through a term and a half. These cover the general ground of economical provision for the household,—marketing, cooking, preserving, order, neatness and beauty in table service, comfort of family, and care of a sick-room. These are supplemented by the lectures upon Household Chemistry and Dairying.

ANATOMY AND PHYSIOLOGY.—*Third Year.*—The study of Physiology is preceded by a course of lectures on anatomy. In this course, such consideration will be given to the form, structure and location of the different organs as is required for the proper comprehension of Physiology and Hygiene; and, in addition, the external form of domestic animals, particularly the ox and horse, will be studied by the class as a preparation for the study of Stock-breeding. The study of Physiology embraces a thorough consideration of the functions of the organs of the human body, and the relations these sustain to the condition of health and disease. Among the principal topics discussed, these may be mentioned: foods and digestions; assimilation; secretion and excretion; the circulation of the blood; the nervous system; the special senses; reproduction. Text-book, Martin's Human Body.

SPECIAL HYGIENE.—To the ladies of the fourth year, a course of daily lectures is given by the lady superintendent of the sewing-room, upon the laws of life and health. The course extends over a period of ten weeks, and covers questions pertaining to personal health and the health of the household, such as food, air, exercise, clothing, temperature of rooms, etc.

ENTOMOLOGY.—This science is studied with especial reference to its economical relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life-history of beneficial and injurious insects, and means of encouragement of one and the control of the other. Here, as in botany, the student is led to form a basis for the study by his own observations. The instruction is presented in the form of lectures. Illustrations are furnished from the individual collections of the students, and from the entomological collections belonging to the College. Charts and drawings from nature are used to illustrate points of value in classification.

ZOOLOGY.—The time devoted to this study is in part given to a view of comparative anatomy and physiology. The latter portion of the term is occupied by a study of the system of zoological classification in present use, accompanied and illustrated by dissections, and the study of fresh, alcoholic and mounted specimens.

MINERALOGY AND GEOLOGY.—For six weeks in the second year, two hours a day are given to mineralogy. This includes the study of crystallography, with the properties, forms and uses of the principal minerals of the United States. Blowpipe analysis forms an important part of the course, each student being required to name and identify a large series of minerals. Text-book, Dana's Mineralogy and Lithology.

A term's study in the fourth year gives a view of the causes which have produced geologic changes in the past, of the general arrangement of the earth's crust, and of special peculiarities of various strata. Attention is given to the formation of soils and deposits of valuable minerals, especially in Kansas. Text-book, Dana's Geologic Story.

PHYSICS AND METEOROLOGY.—Two terms' work give an opportunity for experimental study of the laws of heat, light, with spectrum analysis, electricity and magnetism, and the relation of these forces to the arts of life. It also includes the constitution of the atmosphere, the measurement of temperature and humidity, atmospheric pressure, and the relation of these to climatology. A full course of meteorological observations is taken, with careful study of instruments and methods. Text-books, Miller's Chemical Physics and Loomis' Meteorology.

ARITHMETIC.—One term is given to a general review of arithmetic, the greater part of the time being spent on percentage and its applications. Accuracy and rapidity in computations are required; and to those deficient in this respect, a thorough drill is given.

BOOK-KEEPING.—Beginning with a simple cash account, book-keeping is developed through all the principles of single and double entry. Each student provides a full set of blanks and keeps a regular set of books, in which accuracy of calculation and posting, and neatness of execution are regarded as essential as correct understanding of the principles. No text-book is used, but all forms and problems are furnished in the class-room.

ALGEBRA.—Algebra is studied two terms. The first is wholly given to the literal notation. The student is thoroughly drilled in the fundamental rules, as applied to whole, fractional, and exponential quantities. The second term is devoted to the various forms of the equation and its applications. The equation in its various forms,—simple, quadratic, radical, etc.,—is studied, as an instrument for solving the problems of practical life, in which quantity is an item; for demonstration of geometrical and trigonometrical theorems; and for the construction of formulas for the use of the engineer and the artisan. Text-book, Thomson's Collegiate Algebra.

Three things are aimed at in the course in Algebra: first, to train the pupil to methods of reasoning; second, to attain facility in methods of operation; third, to secure expertness in the use of algebraic formulas.

GEOMETRY—Two terms are given to Geometry. In geometrical drawing, the student has already become familiar with geometrical forms and their construction. The first term is devoted to plane Geometry. During the second term, solid and spherical geometry are studied in connection with technical drawing. Practical problems, involving the principles demonstrated, are given to the class. Text-book, Olney's Elements. Hand-books of engineering and of various arts are used for reference.

TRIGONOMETRY AND SURVEYING.—The principles of plane Trigonometry, involved in mensuration and surveying, are first mastered. Surveying includes theory, adjustment and use of instruments; history and methods of U. S. Government Surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying· leveling—section and cross section; computation of earth-work; field practice with transit, compass, chain, level and rod; drawing and ornamentation of plans and profiles. Text-book, Ray's Trigonometry and Surveying.

MECHANICS AND ENGINEERING.—A careful consideration of the laws of motion and force, as exhibited in all kinds of machines, and in various phenomena of nature, occupies a single term. Another term is given to proper study of materials for buildings, their construction and durability; forms of roofs and bridges; and care and use of machinery. Text-books, Peck's Mechanics, Mahan's Civil Engineering.

DRAWING.—This study is taught four terms, two of which are in the first, one in the second, and one in the third year. Students that show special aptitude in this direction are permitted to pursue the study during the remainder of the course.

First Term.—Definitions of lines and geometrical figures; judging and measuring lines and angles; construction of perpendiculars to given lines, of triangles, four-sided figures and polygons, of the circle and its secant lines, of ellipses, and of various geometrical ornaments. Prof. Walter Smith's four books on geometrical drawing are used as text-books.

Second Term.—Free-hand drawing accompanying botany. After the study of numbers 3, 4 and 5 of Prof. Walter Smith's Text-books of Art Education, drawing from nature is taken up. Leaves, flowers and fruits are taken as subjects, and placed in such positions that the perspective will not interfere seriously with a correct perception of form. Each student is required to finish a set of drawings. Lectures on principles and history of ornamentation are given occasionally.

Third Term.—Projection of straight lines and circles; use of drawing-board, T-square, and water colors; principles of shades and shadows; principles of parallel and angular perspective; principles of topographical drawing.

Fourth Term.—Projection of the conic sections and other regular curves; intersections of geometrical solids. Each student is required to draw and color a set of plans for a simple farm building, and another set of plans giving details of some farm machine.

ENGLISH LANGUAGE AND LITERATURE.—*First Year.*—The study of English Grammar is made to serve directly in clear perception and correct expression. Such practice in analysis and parsing as may give the pupils a clear idea of the English sentence in all its parts, is associated with daily exercises in expression and criticism. A careful study of words and their elements,—roots, stems, prefixes and suffixes,—associating them with their origin and history, continues the course in English. Compound terms in formation and use, distinctions in synonyms, and associated meanings of words, are studied with care. Sentences are also analyzed with reference to their meaning, varieties of expression for the same meaning, shades of thought, and propriety in expression. At the same time, the daily exercises are made a means of training in exact articulation, spelling, writing, and the essentials of good reading. Text-books, Reed and Kellogg's Higher English Lessons, Swinton's Word Analysis.

Principles and methods in English Composition are then taken up, with David J. Hill's Elements of Rhetoric for a text-book. Numerous exercises and revisions familiarize the students with the essentials of neat, legible manuscript, and clear, forcible expression.

Each class meets once every fortnight for drill in elocution.

Third Year.—A term's study of higher Rhetoric is occupied with the principles of clear explanation and convincing argument, as well as the outline of sound criticism. This is fo lowed by a term spent in the history of English language and literature, with abundant illustrations from the best authors. Students are led in this way to appreciate the power of our mother-tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College library, and are under constant oversight in the expression of their thoughts in writing. Original declamations, carefully prepared, and delivered before the students and Faculty, make a part of the drill in the higher classes.

HISTORY AND POLITICAL ECONOMY.—Ridpath's United States History occupies a term's study in the first year; and special attention is given to the form and growth of the government under which we live. In the fourth year, a careful study of the Constitution of the United States, with Andrews' Manual as a text-book, is made to show the general principles of government, its means and methods, illustrated by historical references. A single term is given to Swinton's Outlines of General History, with especial emphasis upon the world's progress in science, literature and art.

The study of political economy in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution and consumption of wealth. Chapin's Wayland's Elements is the text-book; but pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions, without bias or prejudice.

LOGIC AND PHILOSOPHY.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles of classification. The previous researches and experiences of the student are made to illustrate these principles. Text-book, Jevon's Elements of Logic.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feelings and volition, are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the basis of a clear understanding of individual rights and duties. Hopkins' Outline Study of Man forms the basis of the course.

INDUSTRIAL ARTS.—The training in these departments is designed to be systematic and complete in each, so that any student following a single line diligently through a four years' course, gains the essentials of a trade and a reasonable degree of skill. Those who wish only a general acquaintance with the arts, can take shorter courses in several of them; but all are to select with definite purpose. In the regular course for farmers, agriculture and horticulture both are required as industrials during definite periods connected with their study: certain terms of practice in the carpenter shop are also essential to readiness upon the farm. These will be adjusted to each other as improved facilities and larger classes require.

Young ladies are required to give the necessary time for practice in the kitchen laboratory, and are expected to show some facility in the practice of the sewing room, though other industrials may occupy their course. Telegraphy and printing are open to the ladies, without fees.

In agriculture and horticulture, the practice is made to illustrate and emphasize the teaching, and covers essentially the same ground. Training in the other arts is as follows:—

Carpentry, etc.—All are enrolled as carpenters, and take the same first lessons in sawing, planing and dressing lumber, making mortises, tenons and joints, and in general use and care of tools. Later, one who chooses a trade is provided with work directly in the line chosen; while the farmers' course provides for general training in a great variety of operations, rather for ingenuity than for skill. In the full course of a carpenter, special instructions are given in the whole range of work, from framing to stair-building. Students are allowed, after attaining sufficient skill, to work upon their own material, under the advice of the superintendent.

Printing.—Two courses are pursued in this art. In one the student is taught the implements or tools employed in typography, and how to use them; composition; imposition; correcting proof; technical terms; presses and their workings; and the general duties of a first-class workman. Every one is encouraged in the study of the rise and progress of printing and related arts. Habits of accuracy and thoroughness are required in order to advancement. The second course of lessons alternates with those in the first, and embraces instruction in spelling, capitalization, syllabication, punctuation, proof-reading, preparation and criticism of essays, and such other work as will make the student accurate and expert in language. Printed lesson-leaves are used instead of a textbook; but much of the instruction is oral,—such as grows out of the every-day experiences of the office.

Telegraphy.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expressions in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business; as, press reports, messages, cypher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping upon exact copies of the blanks in actual use. A portion of the time is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism, involved in telegraphy, are taught and illustrated by experiments. The more recent inventions relating to the art are discussed and explained.